

# Predicting Success of Endovascular Flow Diversion for Cerebral Aneurysms: Single-center Experience of 150 Consecutive Cases.

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## Introduction

Endovascular flow diversion is a recognized therapy for cerebral aneurysms that are technically difficult to treat by surgical or coiling methods alone. After deployment of a flow-diverting stent, the success of aneurysm occlusion is variable. Persistent filling of an aneurysm may be addressed by placement of a second flow-diversion stent, however, the decisionmaking process can be unclear and follow a lengthy period of surveillance. At our institution, we have a consecutive series of 150 intracranial aneurysm cases treated with flow diversion. We sought to determine our own institutional aneurysm occlusion rate. Furthermore, we investigated whether aneurysm location, adjunctive coiling, or the prior treatment affected the occlusion rate compared to initial flow diversion.

## Methods

We retrospectively reviewed a prospectively maintained database of 150 consecutive cases that underwent pipeline embolization device for cerebral aneurysms. Variables collected include aneurysm locations, aneurysm neck size, number of pipeline embolization devices deployed, history of prior treatment for the aneurysm, and whether adjunctive coiling was performed. Follow-up digital subtraction angiography or computed tomography angiography were used to assess aneurysm occlusion at 12 months. We used a cut-off of >=4 mm to signify whether an aneurysm had a wide neck.

## Results

We utilized flow diversion in the treatment of aneurysms in 150 consecutive cases. A total of 172 aneurysms in 136 unique patients were treated. 7 aneurysms were not counted due to lack of followup or aneurysm found to be infundibulum. Mean neck size of 3.4 mm. 84% (144/165) of aneurysms treated were in the anterior circulation.

Aneurysm Location	Frequency	Occlusion within 12 months	Occlusion after 12 months	Combined occlusions	Residual Aneurysms
Cavernous	22 (13%)	16 (73%)	4 (18%)	20 (91%)	2 (9%)
Paraophthalmic	61 (36%)	34 (56%)	12 (20%)	46 (75%)	15 (25%)
Supraclinoid	51 (30%)	35 (69%)	8 (16%)	43 (84%)	8 (16%)
PCOM	15 (9%)	8 (53%)	2 (13%)	10 (67%)	5 (33%)
Ant Choroidal	5 (3%)	2 (40%)	3 (60%)	5 (100%)	0
ICA terminus	1 (1%)	1 (100%)	0	1 (100%)	0
MCA	2 (1%)	1 (50%)	0	1 (50%)	1 (50%)
ACOM	1 (1%)	1 (100%)	0	1 (100%)	0
PCA	2 (1%)	1 (50%)	0	1 (50%)	1 (50%)
A1	1 (1%)	1 (100%)	0	1 (100%)	0
PICA	3 (2%)	2 (67%)	1 (33%)	3 (100%)	0
V4	1 (1%)	0	0	0	1 (100%)
TOTAL	165.00%	102 (62%)	30 (18%)	132 (80%)	33 (20%)

# Results, cont'd.

The most common regions were paraophthalmic (36%, 61/165), paraclinoid (30%, 51/165), and cavernous (13%, 22/165). Radiographic follow-up show complete occlusion in 62% (102/165) by 12 months. An additional 18% (30/165) of patients had complete occlusion after 12 months. Aneurysm location, adjunctive coiling, and prior treatment with coiling, clipping, or flow diversion were not statistically significant predictors of aneurysm occlusion with flow diversion. Wider neck aneurysms trended towards lower occlusion rate (72%, 39/54 versus 84%, 93/111), however the result was not significant.

## Conclusions

Flow diversion can be an effective therapy for intracranial aneurysms. Our data does not support any difference in occlusion rate based on aneurysm location, adjunctive coiling, or prior treatment. Larger datasets are needed to determine if flow diversion alone is truly just as effective with or without adjunctive coiling. Further work is needed to correlate aneurysm sizes and proximity of branch vessels to aneurysm occlusion rate.



## **Learning Objectives**

By the conclusion of this session, participants should be able to: 1) Understand the role of flow diversion as a useful therapy to otherwise challenging aneurysms, 2) Describe how aneurysm morphology, adjunctive coiling, or prior treatment may affect success of aneurysm occlusion by 12 months.

## References

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