

Pipeline embolization of ICA aneurysms with multiple devices results in early cure, without increased risk of peri-procedural complication.

Justin G. Santarelli MD; Alexa Cohen BA; Chirag D. Gandhi MD, FACS; Jared Blaine Cooper MD
Westchester Medical Center
Valhalla, NY

Introduction

The ideal number of pipeline devices used to treat an aneurysm of the internal carotid artery remains a subject of debate.

Methods

We reviewed the results of pipeline flow-diversion for ICA aneurysms from the cavernous through supraclinoid segments performed at a single institution from 2016 through 2017.

Results

44 ICA aneurysms were treated, and all patients underwent angiographic follow-up (mean=6.8 months). 72.7% of patients were treated with multiple devices (mean=2.4). Occlusion rate at initial follow-up for aneurysms treated with multiple devices was significantly greater than in those treated with a single device (90.6% v. 66.7%, p=0.05). Peri-procedural complication rate did not differ between groups (p=0.46) and no neurologic complications were noted at 30-day follow-up. Of aneurysms treated, 36 measured less than 12mm (mean=5.9mm) and 8 measured 12mm or greater (mean=13.4mm). 92% of aneurysms <12mm treated with multiple devices were occluded at first follow-up; 0% were unprotected. In the single device group, 72.7% of aneurysms <12mm were occluded at first follow-up. Among large aneurysms, 87.5% were treated with multiple devices (mean=2.4), with 85.7% achieving occlusion at 6 months. Only one patient with an aneurysm >12mm was treated with a single device and had persistent filling at 6-month follow-up. The peri-procedural complication rate did not differ between subgroups.

Conclusions

ICA aneurysms treated with multiple Pipeline devices are more likely to be cured at 6-month follow-up compared to those treated with a single device, without an increased risk of peri-operative complication. For small and large aneurysms, those treated with multiple devices tended to have a greater rate of occlusion at initial follow-up, however these did not reach statistical significance. Complication rates did not differ between these groups. Neurosurgeons may consider placing multiple devices in ICA aneurysms to achieve more rapid and more likely cure. This technique may result in reduced need for subsequent angiography and re-treatment.

ICA Aneurysms Treated With Single v. Multiple Pipeline Flow Diversion Devices			
	Single PED (n = 12)	Multiple Telescoped PED (n = 32)	P value
Location	8.3% cavernous ICA, 8.3% paraophthalmic ICA, 83.3% supraclinoid ICA	9.4% cavernous ICA, 50% paraophthalmic ICA, 40.6% supraclinoid ICA	
Complete Occlusion Rate*	66.7%	90.6%	P = 0.05
% Female	75%	84%	P = 0.47
% Ruptured	41.6%	15.6%	P = 0.07
% with Previous Treatment*	50%	15.6%	P = 0.02
Complication Rate	8.3%	3.2%	P = 0.46

** denotes statistically significant*

Learning Objectives

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

- 1) describe the factors involved in determining optimal number of Pipeline devices to treat ICA aneurysms.
- 2) identify the merits of achieving more rapid angiographic cure of Pipeline-treated ICA aneurysms.

References

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3. Chalouhi N, Tiomakaris S, Phillips JLH, et al. A single pipeline embolization device is sufficient for treatment of intracranial aneurysms. American Journal of Neuroradiology. 2014; 35(8): 1562-1566.