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Introduction

Recanalization is a significant issue with primary coil embolization of aneurysms and the placement of an intravascular device such as a stent or flow diverter has shown to decrease the need for retreatment, especially for wide-necked aneurysms,

Stent-assisted coil embolization and flow diversion with the Pipeline embolization device (PED) are both effective endovascular treatment options for ophthalmic segment aneurysms (OSA) of the internal carotid artery (ICA).

Objectives

1- To compare the safety and efficacy of pipeline versus stent-coil in treatment of OSA.

2- To determine the effect of patient's and aneurysm's characteristics on surgical and clinical outcomes.

Methods

Two academic institutions in the United States contributed data on consecutive patients with OSA treated with either stent-coiling between 2007 and 2015 or PED placement between 2011 and 2016.

To our knowledge this is largest such study in literature.

Results

Baseline characteristics

The total number of OSA treated with PED and stent-coiling at the two institutions was 62 and 106, respectively.

There was no significant difference in patient's characteristics between both groups. Nevertheless, aneurysms that underwent stent-assisted coiling had a larger maximum diameter ($p = 0.05$), neck size ($p = 0.002$), height ($p = 0.02$), and width ($p = 0.02$).

Treatment outcome

Parameter	Stent-Coil Group	Pipeline Group	P value
No. of aneurysms	62	106	-
Immediate occlusion rate			
Complete occlusion	36 (58.1%)	-	-
Incomplete occlusion	26 (41.9%)	-	
Last imaging follow-up (months; median, range)	22.5 (5-93)	8.7 (3-50)	0.0002
Follow-up occlusion rate			
Complete occlusion	41 (75.9%)	60 (81.1%)	0.516
Incomplete occlusion	13 (24.1%)	14 (18.9%)	
Retreatment			0.062
Endovascular	4 (6.5%)	1 (0.9%)	
Posttreatment mRS			
0-2	57 (96.6%)	89 (94.7%)	0.707
3-6	2 (3.4%)	5 (5.3%)	
Follow-up mRS			
Improved	3 (5.1%)	13 (13.8%)	0.148
No change	52 (88.1%)	73 (77.7%)	
Worsened	4 (6.8%)	8 (8.5%)	
Neurological complications	3 (4.8%)	10 (9.4%)	0.376
Thromboembolic	2 (3.2%)	8 (7.5%)	0.327
Hemorrhagic	1 (1.6%)	2 (1.9%)	1
Permanent visual	0	1 (0.9%)	1

Predictors of complete occlusion

In stent-coiled patients, non-smoking status ($p = 0.026$), and smaller aneurysm diameter ($p = 0.016$), neck ($p = 0.008$), height ($p = 0.009$), and width ($p = 0.007$) were predictive of complete occlusion at last follow up.

Discussion

There were no statistically significant differences in aneurysm occlusion or complications between both treatment options.

PED also has technical advantages over stent-coiling:

Deployed without a need to access the aneurysm sac which reduces the risk of iatrogenic rupture

Multiple aneurysms located in close proximity can be treated in a single procedure.

