

Evaluation of Radiological Features of the Posterior Communicating Artery and their Impact on Efficacy of Saccular Aneurysm Treatment with the Pipeline Embolization Device

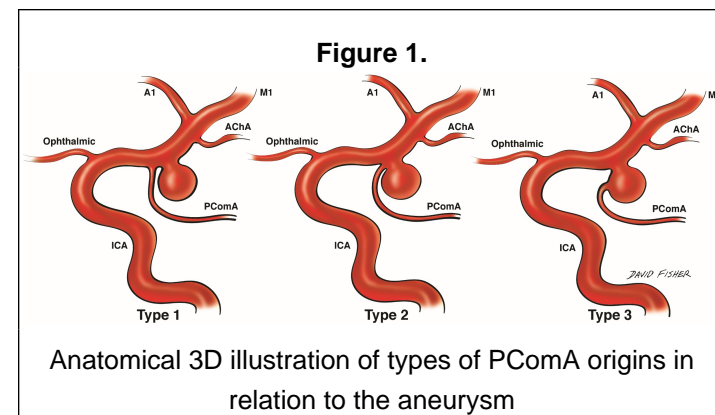
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Introduction

Posterior communicating artery (PCoMA) segment aneurysms are one of the most frequently encountered intracranial aneurysms. Currently, there is limited literature describing the use of the Pipeline embolization device (PED) for PCoMA aneurysms. This study assessed the efficacy and safety of PED in the treatment of saccular PCoMA aneurysms. We also assessed the impact of anatomical variations that may influence both angiographic and clinical outcomes, including the presence of fetal PCoMA, the relationship of the origin of PCoMA to the aneurysm, and patency of the PCoMA following PED placement.

Methods

A multicenter retrospective review of 3 prospectively collected between January 2013 and December 2017 patients treated with PED. The anatomical relationship between the PCoMA origin and the aneurysm was stratified into three types defined as follows: Type 1, PCoMA separate from the aneurysm and arising from the ICA; Type 2, PCoMA from the neck of the aneurysm; and Type 3, PCoMA arising from the dome/body of the aneurysm (**Figure 1**).



Results

We identified 57 patients with 60 saccular aneurysms; Mean age was 60.5 years, and 49 (86.0%) patients were female. A total of 55 (91.7%) aneurysms were unruptured. Median imaging last follow-up was 8.5 months. Complete occlusion at last imaging follow-up occurred in 84.0%. Good functional outcome at last follow-up (mRS 0-2) was achieved in 94.4% of patients. PCoMA patency rate on last follow-up was 77.1%, and of those that occluded, all were asymptomatic (**Table 1**). Presence of fetal PCoMA, type of PCoMA origin, and patency of PCoMA on follow-up were not found to have significant impact on aneurysm occlusion (p=0.61, p=0.40 and p=0.14, respectively) (**Table 2**).

Variable	Complete occlusion at last F/U		p-Value
	No 9 (16.0%)	Yes 42 (84.0%)	
Age at time of treatment, years (median; IQR)	67.5 (IQR 59.5 - 77.5)	61 (IQR 54 - 69)	0.20
Female Gender	7 (87.5%)	35 (83.3%)	0.77
Smoking history	0 (0%)	12 (28.6%)	0.08
Maximal diameter, millimeters (median; IQR)	7.5 (IQR 4.5 - 13)	5 (IQR 3.5 - 8)	0.21
Ruptured on presentation	2 (25.0%)	2 (4.8%)	0.05
Outcomes			
Time to last F/U imaging*	7 (IQR 6.0 to 15.1)	8.7 (IQR 6 to 18)	0.53
PCoMA patency at last F/U imaging	6 (100.0%)	21 (72.4%)	0.14
mRS on last Follow-up			
≤2	7 (87.5%)	39 (92.9%)	0.61
>2	1 (12.5%)	3 (7.1%)	
Retreatment	3 (37.5%)	1 (2.4%)	0.001
Thromboembolic complications	0 (0%)	3 (7.1%)	0.44
Hemorrhagic complications	0 (0%)	4 (9.5%)	0.36

Bold values: p-Value <0.05
n (%); p-Value: Chi2 test
Median (IQR); p-Value: Mann-Whitney test

Evaluation of Differences According to Complete Aneurysm Occlusion

Table 2

Variable	Complete occlusion at last F/U		p-Value
	No 9 (16.0%)	Yes 42 (84.0%)	
Absent PCoMA	2 (25.0%)	13 (30.9%)	0.74
Hypoplastic PCoMA	1 (5.0%)	19 (95.0%)	0.08
Fetal PCoMA	1 (25.0%)	3 (75.0%)	0.61
PCoMA origin type			
Type 1	1 (7.7%)	12 (92.3%)	
Type 2	4 (26.7%)	11 (73.3%)	0.4
Type 3	1 (14.3%)	6 (85.7%)	

Bold values: p-Value <0.05

n (%); p-Value: Chi2 test

Median (IQR); p-Value: Mann-Whitney test

Evaluation of PCoMA Features and their Relationship to Complete Aneurysm Occlusion.

Conclusions

Flow diverter treatment of PCoMA aneurysms results in acceptable occlusion rates. The presence of an artery originating from the aneurysm and a fetal variant PCoMA should not discourage flow diverter treatment in such cases. A high rate of angiographic patency of the PCoMA was found following PED treatment of PCoMA aneurysms. In this study, PCoMA occlusion was not associated with new neurologic deficits or a poor clinical outcome.