Pipeline embolization of ruptured, previously coiled posterior communicating artery aneurysms: case series and considerations for management

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Introduction

Coiled aneurysms have a high recurrence rate, ranging from 13-49%. Posterior communicating artery aneurysms have been shown to have a particularly high rate of recurrence after coiling with prior studies reporting recurrence in up to 37% of cases. In general, only 15% of aneurysms are completely occluded at time of initial coiling, and the presence of residual aneurysm is associated with a higher risk of post-treatment rupture in previously unruptured aneurysms. Previously ruptured aneurysms have an even higher rate of rupture when incompletely coiled, which is a critical factor when evaluating treatment strategies for intracranial aneurysms. The Pipeline Embolization Device (PED) has been effectively used to treat recurrent, previously coiled aneurysms. We assessed the efficacy and safety of the PED in the treatment of primarily coiled, ruptured aneurysms, with a focus on aneurysms of the posterior communicating artery.

Methods

We performed a retrospective analysis of 19 patients who underwent PED treatment of a recurrent, previously coiled, ruptured aneurysm. The most recent cerebral angiogram was reviewed to assess efficacy with regards to recurrence and retreatment rates after PED placement. Safety was evaluated by assessing complications, morbidity, and mortality.

Gender (% Female)	69
Age (mean)	57.4
HTN (%)	38
Tobacco use (%)	69
Aneurysm dome size (mean)	5.8
Number of Pipeline devices	1.5

Results

The average patient age at time of initial rupture was 57 years. Of the 19 aneurysms that recurred, 13 (68%) were Posterior Communicating Artery (PCoA) aneurysms. Of those patients who have received follow-up angiograms (69%) to date, aneurysm obliteration rate is 100%. There were no PED procedural complications or treatment related morbidity or mortalities.

Conclusions

PED as a second-line treatment is a safe and effective modality for achieving aneurysm occlusion in recurrent, primarily coiled, ruptured PCoA aneurysms. We propose that a staged coil-to-PED approach be considered for management of ruptured PCoA aneurysms to achieve aneurysmal obliteration.



Right internal carotid artery angiogram showing a ruptured right posterior communicating artery aneurysm (A). At the time of rupture, the aneurysm was primarily coiled (B). A follow-up angiogram shows coil compaction with recanalization of the aneurysm neck (C). The patient underwent successful flow diversion using the Pipeline Embolization Device (D, arrow). 6-month angiographic follow-up shows no residual aneurysm filling with complete vascular remodeling (E and F).

Learning Objectives

By the conclusion of this session, participants should be able to: 1) describe the likelihood of aneurysm recurrence following primary coil embolization, 2) identify the risks of aneurysm recurrence, particularly after initial rupture, 3) recognize the utility of pipeline embolization for secondary management of recurrent, previously ruptured aneurysms, and 4) describe the potential application of a staged coil-PED treatment strategy for management of ruptured posterior communicating artery aneurysms

References

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