

Utilization of Pipeline Embolization Device for the Treatment of Ruptured Intracranial Aneurysms

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Introduction

Ruptured intracranial dissection and blister aneurysms are challenging lesions for both standard surgical and endovascular techniques. Flow diversion via Pipeline Embolization Device (PED) is an integral part of aneurysm management; however, its utilization in ruptured aneurysms has not been well studied.

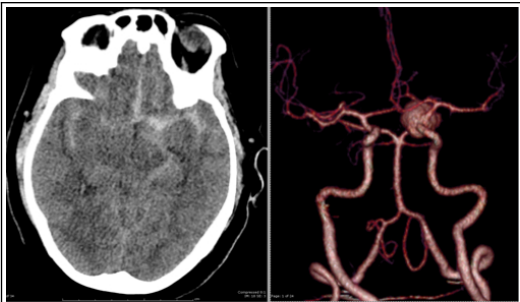
Methods

Clinical and radiographic records of all patients with ruptured cerebral aneurysms who underwent endovascular treatment with PEDs were retrospectively reviewed,

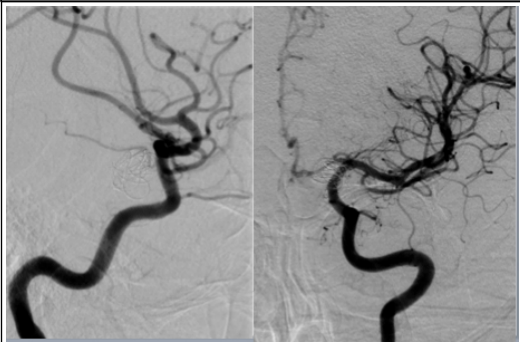
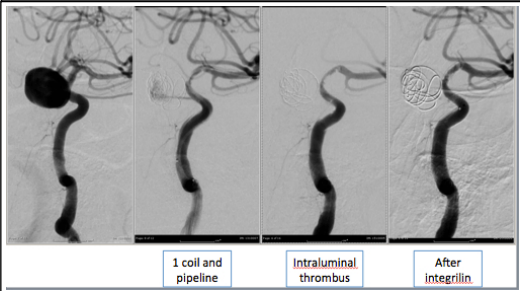
Results

From 2011 – 2013, 10 patients with ruptured aneurysms were treated at our institution. The mean age at surgery was 49.1 and 8 were female. Five patients (50.0%) presented with a Hunt and Hess grade of 3 or above, and 4 required extra-ventricular drain placement.

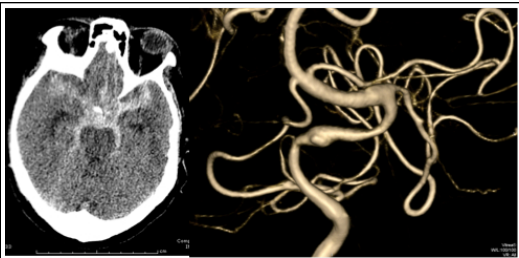
Six patients had dissecting aneurysms, 3 had blister-like aneurysms, and 1 had a recurrent fusiform aneurysm after prior clipping. Average size for the dissecting and fusiform aneurysms was 13.8 mm. Seven aneurysms arose from paraclinoid segment of internal carotid artery, 1 from communicating segment, 1 from M1, and 1 from vertebral artery. PED deployment was successful in all 10 patients, with coil utilized in 6 cases. Nine patients received 1PED during treatment, and the other patient received 2 PEDs.



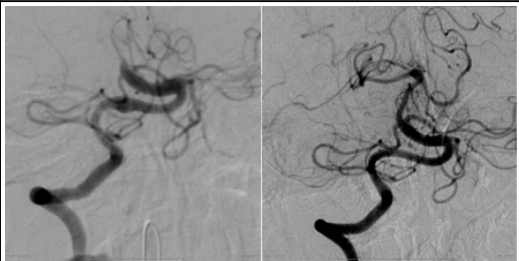
Case 1: ICA fusiform aneurysm



Case 1: 3 month results



Case2: Dissecting V4 aneurysm



Case 2: Immediate and 3 month results

Results

Clinical follow-up was available for an average of 9.7 months (range 2-19 months). All patients had post-operative vascular imaging (8 DSA, 2 CTA): 9 aneurysms had complete occlusion and 1 had small residual filling at neck. There were no neurological complications associated with PED treatment during follow-up period. Two patients developed delayed hydrocephalus and required ventriculoperitoneal shunt placement. Modified Rankin Score (mRS) was 0–2 for all patients at the clinical follow-up visit.

Conclusions

PED can be used safely and effectively in treating ruptured cerebral aneurysms. A combination of flow diversion and coil packing may be needed for ruptured dissecting aneurysms. Implications of dual antiplatelet therapy will be discussed.

Learning Objectives

By the conclusion of this session, participants should be able to 1) understand the indication of using PED for treating ruptured aneurysms; 2) describe the importance of using dual antiplatelet agents with PED treatment and how to monitor treatment responses; and 3) technical aspect of avoiding complications during PED deployment, with or without coil packing.