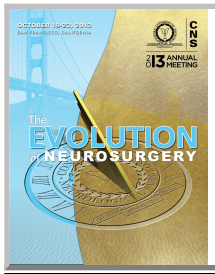

The Phenomenon of Delayed Pipeline Embolization Device Migration: Technical Considerations, Complication Avoidance, and Management.

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Introduction

The Pipeline Embolization Device (PED) is a dedicated flow diverter designed to treat intracranial aneurysms. New safety concerns are emerging as neurosurgeons accumulate experience with the device. In this study, we describe the new phenomenon of spontaneous delayed migration of the PED and discuss important technical considerations for prevention and management of this complication.

Methods

A total of 155 patients were treated with the PED at our institution from November 2010 to January 2013. Patients who had spontaneous delayed migration of their devices during the study period were prospectively identified.

Results

Five patients (3.2%) were found to have spontaneous delayed migration of their PEDs. All 5 cases occurred late during the study period (second half of the cohort). The PED migrated proximally in 4 patients and distally in 1 patient. The migration distance was 11 mm on average (range, 5-20 mm). Mismatch in arterial diameter between inflow and outflow vessels was a constant finding. One patient suffered a subarachnoid hemorrhage and expired as a result of PED migration while one patient presented with complete middle cerebral artery occlusion and was left severely disabled. In the 3 remaining cases, PED migration led to renewed aneurysm filling. PED migration was managed conservatively in 1 patient, with parent vessel occlusion in 1, and with additional placement of PEDs in 3.

Conclusions

Spontaneous delayed migration of the PED is a serious and potentially fatal complication. The device may migrate proximally or distally and result in aneurysm rupture or thrombotic events. Obtaining complete expansion of the PED, using a longer PED, increasing vessel coverage, adjunctive aneurysm coiling, and avoiding dragging and stretching of the PED are important preventive measures. Neurosurgeons should be aware of this serious complication and take all necessary preventive measures.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Understand and describe the phenomenon of delayed PED migration. 2) Discuss important preventive measures and management options. 3) Optimize their technique and protocols to prevent this serious yet unknown complication of PED treatment.

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