CNS 2017 ANNUAL MEETING
BOSTON, MASSACHUSETTS
OCTOBER 7–11, 2017

Is the Pipeline Embolization Device for Intracranial Aneurysms Less Effective in Older Patients?

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Introduction

Flow diversion using the Pipeline Embolization Device (PED) for the treatment of intracranial aneurysms is associated with a high rate of aneurysm occlusion. However, clinical and radiographic predictors of incomplete aneurysm occlusion are poorly defined. In this study, predictors of incomplete occlusion at last angiographic follow-up following PED treatment were assessed.

Methods

A retrospective analysis of consecutive aneurysms treated with PED between 2009 and 2016 at three academic institutions in the United States was performed. Cases with angiographic follow-up were selected to evaluate factors predictive of incomplete aneurysm occlusion at last follow-up.

Results

A total of 465 aneurysms treated with PED were identified; 380 (81.7%) aneurysms (329 procedures; median age 58, female-to-male ratio was 4.8:1) had angiographic follow-up, and were included. Complete occlusion (100%) was achieved in 78.2% of aneurysms. Near complete (90-99%) and partial (< 90%) occlusion were collectively achieved in 21.8% of aneurysms, and were defined as incomplete occlusion. Of aneurysms followed for at least 12 months (211 out of 380), complete occlusion was achieved in 83.9%. Older age (> 70 years), non-smokers, aneurysm location within the posterior communicating artery or posterior circulation, larger aneurysm maximal diameter (= 21 mm), and shorter follow-up time (< 12 months) were significantly associated with incomplete aneurysm occlusion at last angiographic follow-up on univariable analysis. However, on multivariable logistic regression, only age, smoking status, and duration of follow-up were independently associated with occlusion status.

Conclusions

Complete occlusion following PED treatment of intracranial aneurysms can be influenced by several factors. Of these factors, older age (> 70 years) and non-smokers were an independent predictor of incomplete occlusion. While the physiologic explanation for these findings remains unknown, the identification of factors predictive of incomplete aneurysm occlusion following PED placement can assist in patient selection and counseling, and might give an insight into the biological factors affecting endothelization.

Learning Objectives

To identify factors associated with incomplete occlusion of intracranial aneurysms following PED placement.

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