

# The Pipeline Embolization Device: Learning Curve and Predictors of Complications and Aneurysm Obliteration.

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## Introduction

The pipeline embolization device (PED) has emerged as a promising treatment for intracranial aneurysms.

The purpose of this study was to assess the safety and efficacy of the PED, analyze the effect of operator's experience on the complication rate, and identify predictors of complications and obliteration.

## Methods

A total of 109 patients with 120 aneurysms were treated with PED at our institution. The patient population was divided into 3 consecutive equal groups to assess whether overall and major complication rates have decreased over time: Group I, patient 1-37; Group II, patient 38-73; and Group III, patient 74-109.

## Results

The number of PEDs used was 1.40 per aneurysm. Symptomatic and major procedure-related complications occurred in 11% and 3.7% of patients, respectively. The rate of complications decreased from 16.2% in group I to 5.6% in group III and the rate of major complications dramatically fell from 10.8% in group I to 0% in groups II and III ( $p < .05$ ). Procedure time significantly decreased over time ( $p = 0.04$ ). In multivariate analysis, previously treated aneurysms were predictive of procedural complications ( $p = .02$ ). At the latest follow-up, 65.8% of aneurysms were completely occluded, 9.6% were near-completely occluded, and 24.6% were incompletely occluded. In multivariate analysis, fusiform aneurysms ( $p = .05$ ) and shorter angiographic follow-up ( $p = .03$ ) were negative predictors of aneurysm obliteration.

## Conclusions

PED therapy has a favorable safety-efficacy profile. The risk of complications appears to decrease dramatically with physician experience supporting the existence of a learning curve. Patients with previously treated aneurysms have higher complication rates whereas fusiform aneurysms achieve lower obliteration rates.

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) Discuss the effect of the learning curve on procedural safety with PED therapy. 2) Discuss predictors of morbidity and aneurysm obliteration with the PED. 3) Optimize the treatment of patients undergoing PED therapy.

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