

Successful Flow Diversion of Cerebral Aneurysms in Clopidogrel Hyporesponders (PRU 200): An Argument for Antiplatelet Monotherapy?

Geoffrey P. Colby MD, PhD; Li-Mei Lin BA; Daniel Lubelski MD; Matthew Bender MD; Risheng Xu AB AM MD PhD; Bowen Jiang MD; Judy Huang MD; Rafael J. Tamargo MD; Alexander Lewis Coon MD
Department of Neurosurgery, Johns Hopkins Hospital



Introduction

Endovascular aneurysm treatment by flow diversion has classically relied on dual anti-platelet therapy with Aspirin and clopidogrel to reduce thrombotic complications. The heterogenous clopidogrel response of patients has made P2Y12 testing increasingly popular. Clopidogrel hyporesponders (defined as PRU=200) are often re-dosed with clopidogrel or switched to alternate anti-platelet regimens. However, little clinical validation exists for these practices, and they might actually increase risks of hemorrhagic complications. We sought to evaluate periprocedural outcomes following flow diversion in patients maintained on standard Aspirin and clopidogrel regimens with PRU=200.

Methods

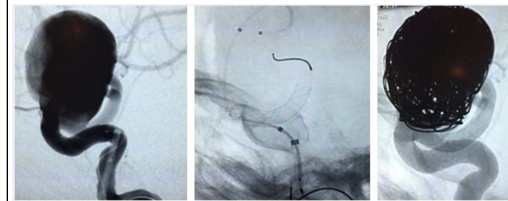
A single-center prospectively collected aneurysm database was reviewed for adult patients on standard dual antiplatelet regimens (Aspirin 325mg + Clopidogrel 75mg daily) who underwent endovascular embolization of ICA and proximal ACA/Acom aneurysms with the Pipeline Embolization Device (PED). Patients with pre-embolization P2Y12 testing and PRU=200 were included.

Results

49 patients (mean age 56, 74% women) met inclusion criteria.

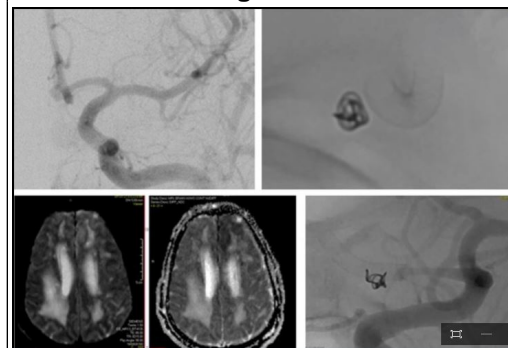
- Forty-seven (96%) patients had a single aneurysm treated, and 2 (4%) had 2 aneurysms treated;
- 84% of the aneurysms were on the ICA and 16% were on the ACA (Acom and A1-2).
- Aneurysm size ranged from 2-28mm. PED length ranged from 10-35mm.
- Pre-procedure PRU levels ranged from 200 to 361. ReoPro was administered in 5/49 (10%) cases, with platelet plug visualized in 4/49 cases (8%).
- Four patients (8%) had transient neurological deficits (resolved completely during hospital stay), with only 1 of these requiring ReoPro during the procedure.
- No patients had major or minor permanent strokes, and no patients had hemorrhagic complications.

Figure 1.



Pre-embolization, post-PED, and post-adjunctive coiling digital subtraction angiogram 70 year-old female who underwent uncomplicated treatment of a 26mm ophthalmic aneurysm with a pre-procedural P2Y12 of 252.

Figure 2.



Clockwise from upper left: (a) Left internal carotid angiogram showing ruptured 4mm anterior communicating artery aneurysm (b) after pipeline embolization for recurrence after coiling. (c) Post-embolization day two angiogram showing lack of perfusion distal to the stent. (d) MRI demonstrating diffusion restriction in the left anterior cerebral artery territory.

Conclusions

Hyporesponse to clopidogrel (PRU=200) is not a contraindication to aneurysm treatment with the PED in patients on a standard dual antiplatelet regimen of Aspirin 325mg and clopidogrel 75mg daily. These data suggest a diminutive role of clopidogrel in preventing thrombotic complications during these procedures.

Learning Objectives

By the conclusion of this session, participants should be able to recognize that Pipeline embolization can be performed safely and effectively in patients on Aspirin and clopidogrel with PRU > 200. This challenges the traditional thought that dual anti-platelet medications are required for safe aneurysm treatment with flow diverters.