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# P2Y12 Precision in Therapeutic Monitoring of Dual Anti-Platelet Therapy for Flow Diversion of Cerebral Aneurysms

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## Learning Objectives

By the conclusion of this session, participants should be able to describe the intra-individual PRU variance observed in this study.

## Background

- Dual antiplatelet therapy (DAT) commonly consists of aspirin and clopidogrel
- DAT is the standard of care for intracranial stenting, including flow diversion
- Clopidogrel response varies by individual

**Study Aim:** Investigate the real-world precision of P2Y12 assessment of clopidogrel response

**Figure 1: VerifyNow P2Y12 Point-of-Care Test**

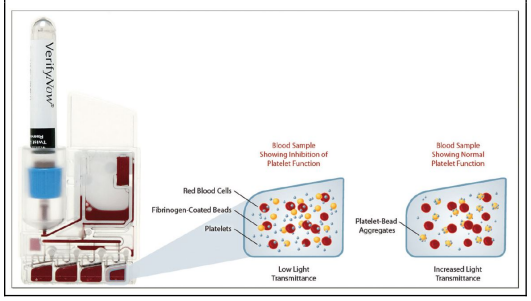


**Figure 1.** Whole blood is mixed with a platelet agonist and fibrinogen-coated beads. Optical transmission over time indicates platelet inhibition levels.

## Methods

A retrospective review of an IRB-approved, prospectively maintained cerebral aneurysm database identified 588 patients who underwent Pipeline Embolization Device.

(PED) treatment from 2011-2017. The data collected for each patient included:

- P2Y12 measurement history
- Medication histories in the times surrounding P2Y12 measurements

Patients were selected based on the following criteria:

- Patients with multiple P2Y12 assays drawn within a 24-hour window while therapeutic for clopidogrel (60<PRU<200) were identified
- A single patient could contribute multiple, independent PRU measurements, if taken within separate, exclusive 24-hour groupings
- Remaining inclusion criteria is shown in **Fig. 2**

**Figure 2: Patient Inclusion Flowchart**

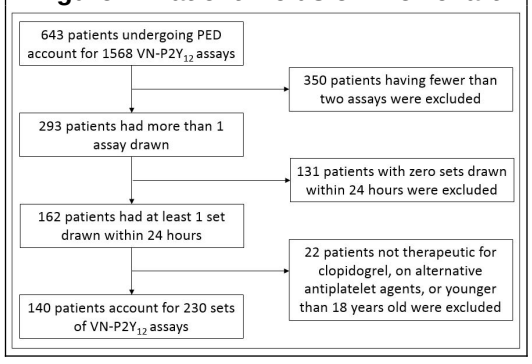


**Figure 2.** Patient inclusion criteria. Patients whose P2Y12 levels were drawn multiple times within 24 hours while therapeutic for aspirin and clopidogrel were selected.

## Results

- 1460 PRU measurements were recorded across all patients
- 261 (44%) patients with >1 PRU assay drawn.
- 121 (21%) patients had multiple PRU measurements within 24 hours, totaling 206 independent 24-hour sets of PRU measurements.
- **Fig. 3** shows the spread of intra-group ranges across all PRU measurements
- Average PRU fluctuation across all 24-hour groupings was 36 points

Only 75% of PRU measurements grouped by 24-hour period remained within their original therapeutic category:

- 88 (43%) all therapeutic
- 49 (24%) all hypo-responsive
- 18 (9%) all hyper-responsive

**Figure 3: PRU range distribution for 206 groupings**

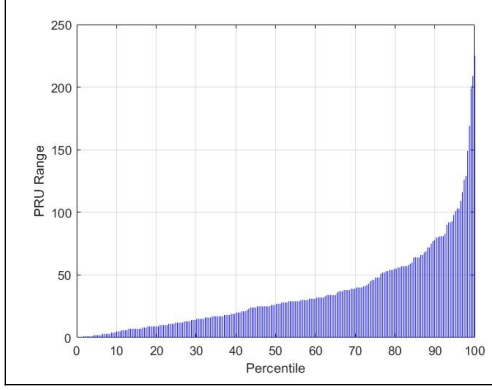


**Figure 3.** PRU range for 206 independent 24-grouping of PRU measurements. The 24-hour set P2Y12 fluctuation of the 25th , 50th , and 75th %-tiles were 11 points, 28 points, and 48 points respectively.

**Figure 4: 24-hour PRU groupings stratified by individual PRU value**

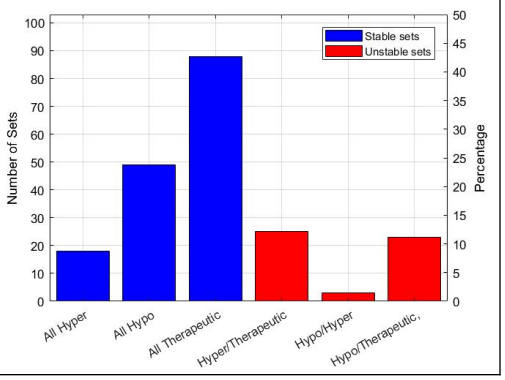


**Figure 4.** Stratification of 206 24-hour groupings of PRU measurements by clopidogrel responder category. 24% of patients fluctuated between therapeutic categories when multiple P2Y12 assessments were drawn within a 24-hour period: 29 (13%) between hypo-response and therapeutic, 23 (10%) between hyper-response and therapeutic, and 3 (1%) between hypo-response and hyper-response.

## Conclusions

There is controversy about the utility of P2Y12 assessment of therapeutic response to clopidogrel. Our experience suggests P2Y12 is an often-imprecise measure, and this should be considered when utilizing P2Y12 levels for clinical decisions.

## References

Bender MT, Lin LM, Colby GP, Lubelski D, Huang J, Tamargo RJ, Coon AL. P2Y12 hyporesponse (PRU>200) is not associated with increased thromboembolic complications in anterior circulation Pipeline. *J Neurointerv Surg.* 2017 Oct;9(10):978-981.