



LABORATORY ALLIANCE of Central New York, LLC

Update on Plavix (Clopidogrel) Response Assay Platelet Function P2Y12

Since early 2008, Laboratory Alliance of Central New York has offered an FDA-approved test for assessing P2Y12-mediated platelet function, called "Plavix Response". The VerifyNow P2Y12 assay measures platelet inhibition by substances known to specifically block the P2Y12 receptor. These compounds include the thienopyridine class of drugs, including clopidogrel and ticlopidine. Platelet P2Y12 inhibition can be determined while the patient is still taking thienopyridines, eliminating risks associated with drug withdrawal. The Plavix Response test joins the existing Aspirin Resistance assay, also performed on the VerifyNow system. For patients taking both aspirin and a thienopyridine, the two tests may be ordered simultaneously. This assay does not replace the PFA-100 Platelet Function Screen, which is designed to assess overall platelet function.

Clinical Significance:

Antiplatelet therapy has become a cornerstone for both cardiovascular and neurovascular medicine. This trend has led to the emergence of the new clinical entity of clopidogrel resistance. Research has revealed that 5% to 30% of patients do not respond adequately to standard doses of clopidogrel. The consequences of clopidogrel resistance can be catastrophic, necessitating a means for monitoring antiplatelet therapy. Traditional platelet aggregometry is time-consuming, technically challenging and expensive. Platelet baseline function for aggregometry also requires drug withdrawal, with its significant associated risks.

The VerifyNow P2Y12 whole blood assay introduces a rapid and safe method for determining platelet inhibition by thienopyridine drugs. This turbidometric test yields results that are more sensitive and specific than ADP-induced platelet aggregometry. P2Y12-mediated platelet aggregation is reported in P2Y12 Reaction Units (PRU). A dual channel system allows for determination of platelet inhibition in patients *currently taking thienopyridines*. This eliminates the need for drug withdrawal and obviates the need for testing the patient twice, providing a safer and more cost-effective approach to monitoring platelet inhibition. Aspirin inhibition of platelet function is measured in a third channel on the VerifyNow system. Therefore, aspirin does not interfere with the P2Y12 assay, and its effect can be measured and reported separately for patients on combination aspirin/clopidogrel therapy.

Several studies suggest PRU levels **less than 194** were indicative of adequate P2Y12 receptor blockade. The Plavix Response assay may be useful for detecting thienopyridine resistance, monitoring dosage effect and ensuring compliance. Patients with adequate platelet inhibition have an increased risk of bleeding, and withdrawal of clopidogrel is recommended five days prior to surgery. Use of the Plavix Response assay may detect those patients with inadequate platelet inhibition (PRU>194) that can be taken to surgery without delay. For those patients requiring urgent/emergent surgery, the Plavix Response assay may help optimize blood product utilization.

Test Code: PFP2Y

Method: Light Transmittance

Specimen Requirements: Two Greiner sodium citrate (*light blue cap*) tubes, each filled with 2 mL of blood. The specimen **MUST** arrive at the Operations Center within 3 hours of collection. **DO NOT CENTRIFUGE** the tube.

Collection Notes: Draw 2 mL blood into each of the two Greiner citrate (light blue) tubes filled to the proper level (*1 part anticoagulant to 9 parts blood*). Invert tubes several times to avoid clotting. Verify that the expiration date of the tubes is acceptable.

Unacceptable Conditions: Specimens that are clotted, hemolyzed, collected in the wrong tube, less than 90% filled, centrifuged, or received outside the stability limits are unacceptable for testing.

Interferences: GPIIb/IIIa inhibitors (ReoPro[®], Integrilin[®], Aggrastat[®])
Low hematocrits and low platelet counts

Stability: Ambient: 4 hours

Schedule: Daily

CPT Code: 85576

Billing Code: 4010483

Storage and Transport: Transport at room temperature. Specimens need to arrive at the laboratory within 3 hours of collection.

For Information: If you have any questions or concerns regarding this test, please contact Ms. Anne Chamberlain, Hematology Manager, at 410-7048.

References:

1. ACC/AHI/SCAI 2005 Guideline update for percutaneous coronary intervention. ACC/AHI/SCAI Practice Guidelines.
2. Ascione, R. et al. 2005. In-hospital patients exposed to clopidogrel before coronary artery bypass graft surgery: A word of caution. *Ann Thorac Surg.* 79(4): 1210-16.
3. Gurbel, P.A. et al. 2003. Clopidogrel for coronary stenting – Response variability, drug resistance, and the effect of pretreatment platelet reactivity. *Circulation.* 107(23): 2908-13.
4. Fiorella, D. et al. 2005. Antiplatelet therapy in neuroendovascular therapeutics. *Neurosurg Clin N Am.* 16: 517-40.
5. Nguyen, T.A. et al. 2005. Resistance to clopidogrel: A review of the evidence. *J Am Coll Cardiol.* 45(8): 1157-64.
6. Serebruany, V.L. et al. 2005. Variability in patient responsiveness to clopidogrel among 544 individuals. *J Am Coll Cardiol.* 45(2): 246-51.

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