

## Platelet Function Assay FAQ

### 1. What is the Platelet Function Assay (PFA) test?

The PFA test is a new laboratory screening test of platelet function that measures both platelet adhesion and aggregation (primary hemostasis).

### 2. Why order a PFA test?

The PFA test is a rapid, accurate screening test of platelet function. Common clinical applications include the following:

- Preoperative evaluation of platelet function
- Evaluation of women with menorrhagia
- Determining the presence of drug-induced platelet dysfunction
- Determining patient compliance with aspirin and other antiplatelet drugs
- Determining platelet functionality in high-risk pregnancy
- Evaluation of patients with suspected inherited or acquired platelet disorders, such as von Willebrand disease (vWD)
- Evaluation of the bleeding patient
- Monitoring DDAVP treatment in patients with Type I vWD

### 3. How does the PFA test compare to the Template Bleeding Time?

Most studies found that the PFA test and template bleeding time give equivalent results in about 75% of cases. Most of the discrepancies are patients with a normal BT and abnormal PFA test. Aspirin and vWD are the most common causes for this discrepancy, since the bleeding time is very insensitive to aspirin and may miss as many as one third of cases of vWD.

The template bleeding time remains poorly reproducible and is relatively insensitive to platelet function defects in spite of many attempts at standardization. The template bleeding time has been widely used as a pre-operative screening test despite numerous studies that have indicated that it is not beneficial for this purpose. On the basis of these studies, the College of American Pathologists and American Society for Clinical Pathology officially published their position on this issue. Excerpts from their paper are as follows:

- "In the absence of a history of a bleeding disorder, the bleeding time is not a useful predictor of the risk of hemorrhage associated with surgical procedures."
- "A normal bleeding time does not exclude the possibility of excessive hemorrhage associated with invasive procedures."
- "The bleeding time cannot be used to reliably identify patients who may have recently ingested aspirin or non-steroidal anti-inflammatory agents or those who have a platelet defect attributable to these drugs. The best preoperative screen to predict bleeding continues to be a carefully conducted clinical history that includes family and previous dental, obstetric, surgical, traumatic injury, transfusion, and drug histories. In the absence of a history of excessive bleeding, the bleeding time fails as a screening test and is, therefore, not indicated as a routine preoperative test"

P. Peterson, T. E. Hayes, C. F. Arkin, E. G. Bovill, R. B. Fairweather, W. A. Jr Rock, D. A. Triplett, and J. T. Brandt. The preoperative bleeding time test lacks clinical benefit: College of American Pathologists' and American Society of Clinical Pathologists' position article. *Arch Surg* 133 (2):134-139, 1998.

### 4. How is the PFA test performed?

The PFA test is performed with a laboratory analyzer termed the PFA -100. This instrument uses small membranes coated with either collagen and epinephrine (Col/Epi) or collagen and ADP (Col/ADP). Anticoagulated whole blood is passed through the membranes at a high shear rate to simulate the *in vivo* hemodynamics in the small capillaries. Platelets adhere to the membranes and gradually occlude a small aperture in the center of each membrane. The time, in seconds, for

blood to completely occlude the aperture is referred to as the Closure Time (CT).

The reason for using two membranes is to differentiate between drug-induced platelet defects and other platelet defects. The Col/Epi membrane is very sensitive to all platelet function defects, including aspirin-induced platelet dysfunction. In contrast, the Col/ADP membrane is relatively insensitive to short-term aspirin effect.

#### **5. How are the results interpreted?**

The PFA test result is dependent on platelet function, plasma von Willebrand Factor level, platelet number, and (to some extent) the hematocrit.

The PFA test is initially performed with the Col/Epi membrane. A normal Col/Epi closure time (<183 seconds) excludes the presence of a significant platelet function defect.

If the Col/Epi closure time is prolonged (>183 seconds), the Col/ADP test is automatically performed. If the Col/ADP result is normal (<122 seconds), aspirin-induced platelet dysfunction is most likely.

Prolongation of both test results (Col/Epi >183 seconds, Col/ADP >122 seconds) may indicate the following;

- Anemia (hematocrit <0.28)
- Thrombocytopenia (platelet count < 100 x 10<sup>9</sup>/L)
- A significant platelet function defect other than aspirin

Once anemia and thrombocytopenia have been excluded, further evaluation to exclude von Willebrand disease and inherited/acquired platelet dysfunction such as renal failure storage pool disease, release defect, Bernard-Soulier disease, and Glanzmann thrombasthenia should be considered. Long-term aspirin therapy may modestly prolong the Col/ADP.

#### **6. What are the specimen requirements for the PFA test?**

The specimen requirement for the VCU Hemostasis Laboratory is two, 4.5 mL, light blue-top citrate tubes. **The tubes must not be refrigerated or passed through the pneumatic tube system. The tubes must be hand-delivered to the Hemostasis Laboratory within one hour of collection.**

#### **7. When is the PFA test performed? How soon are the results available?**

The PFA test is available Monday through Friday from 8:30 A.M. to 3:30 P.M. The test is **NOT** available on an emergency basis at this time.

The PFA test can be scheduled by calling 828-6767 Ext. 521. Within VCU Hospitals and Clinics, the PFA test is available in MIS (go to Test Ordering and then coagulation Page 2 for Platelet Function Assay). The results are available within one hour after the specimen is received in the laboratory.

Local clients of the VCU Hemostasis Laboratory may obtain a PFA test as long as we receive the blood sample within one hour of collection.

#### **8. Where can I obtain more information?**

General questions about the PFA test can be addressed to the director ([rsriley@hsc.vcu.edu/804-828-0338](mailto:rsriley@hsc.vcu.edu/804-828-0338)). Specific questions about scheduling should be referred to the VCU Hemostasis Laboratory at 804-828-6767 Ext. 521. Numerous publications (>150) about the PFA-100 can be assessed through PubMed or other on-line services.