Antiplatelet drugs and neurosurgical procedures

Platelet mechanistics and platelet function tests

Platelets are important for maintaining vascular endothelial integrity and are involved with hemostasis in conjunction with coagulation factors. Severe thrombocytopenia can result in petechial hemorrhages or spontaneous intracerebral hemorrhage (ICH). Vascular wall disturbance is the initial stimulus for platelet deposition and activation. Platelets adhere to collagen via surface receptors GPIb- V-IX and von Willebrand factor. This adhesion sets off a cascade of reactions, which result in platelet aggregation forming a hemostatic plug. Historically, bleeding time (BT) was used as the screening test for abnormalities of platelet function. Due to unreliability, many institutions have replaced the BT with the platelet function assay (PFA) using the PFA-100 (platelet function analyzer).

There are limited studies confirming its use according to the International Society of Thrombosis and Hemostasis ^{1) 2)} In the PFA-100, primary hemostasis is simulated under "high-shear" flow by the movement of citrated blood through a membrane-impregnated capillary in two collagen-coated cartridges; one stimulates platelets with adenosine diphosphate (ADP) and the other with epinephrine ³⁾. This interaction with the collagen induces a platelet plug, which closes an aperture. Results are reported as closure time in seconds. This method is eligible as a screening test for primary hemostatic disease such as von Willebrand disease as well as for monitoring the effect of antiplatelet therapy. The PFA-100 works for testing with aspirin but not with thienopyridine drug class (e.g. clopidogrel). Newly available PFA cartridges detect P2Y12 receptor blockade in patients on theinopyridine drugs ⁴⁾. VerifyNow® measures agonist-induced aggregation as an increase in light transmittance. The system contains a preparation of human fibrinogen-coated beads, which cause a change in light transmittance by ADP-induced platelet aggregation ⁵⁾. There is little correlation between the PFA-100 results and VerifyNow Assay.

1)

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