Platelet testing and disorders

Laboratory methods

In this laboratory, platelets are measured on the Beckman DxH analyser by the impedance counter method and may also be viewed under the microscope. Alternatively, platelets may be counted using a haemocytometer to calculate the concentration in diluted whole blood or platelet-rich plasma. (Manual counts are time-consuming and imprecise.) The count may be estimated from the red blood cell count on automated analysers by then calculating the red cell: platelet ratio on a blood film. Finally, platelets may be counted accurately on the flow cytometer using a fluorochrome-labelled monoclonal antibody.

Inherited platelet disorders

See annotated journal article on Inherited Platelet Disorders (Handin, 2005)

Investigations for a suspected inherited platelet disorder

Guidelines taken from: Bolton-Maggs, P. H. B. et al., (2006) A review of inherited platelet disorders with guidelines for their management on behalf of the UKHCDO. **British Journal of Haematology** 135(5): pp.603–633.

- Full blood count and film - The platelet count should be measured and a peripheral blood film should be examined to confirm the platelet count and assess platelet size and morphology and any white cell or red cell changes. If clumping is seen, a platelet count in a citrated sample should be analysed. Giant platelets may not be identified automatically and in syndromes with large platelets an inappropriately low platelet count may be reported on an impedance analyser like the Beckman DxH.
- Coagulation screen - This should include a prothrombin time, activated partial thromboplastin time, Clauss fibrinogen and thrombin time. All patients with symptoms suggestive of a platelet function disorder should be investigated for VWD, which is much more common.
- Bleeding time - This is now rarely used and is not suitable as a screening test, but should be considered in specific circumstances in the investigation of patients with bleeding disorders if other tests have not demonstrated a defect.
- Platelet function analyser-100 (PFA-100) measurements - Results will be significantly abnormal in Glanzmann thrombasthenia and Bernard–Soulier syndrome and may be sensitive to platelet storage pool disorders, primary secretion defects and some other conditions. However, the test is not reliable and can be affected by platelet count, haematocrit, diet and aspirin, and is very dependent on VWF levels.
- Platelet aggregation - May give important information about platelet function, especially as it provides information on the time course of activation and there are aggregation responses associated with specific conditions.
- Flow cytometry - May be used to measure platelet activation as well as surface GPs, α-granule release, phospholipid expression and microvesicle production. The most common applications, however, are the assessment of GPIb/IX/V and GPIIb/IIIa in the diagnosis of Bernard–Soulier syndrome and Glanzmann thrombasthenia.
- Transmission electron microscopy (EM) - Study of thin sections of fixed platelets may be of use in assessing platelet granule defects and changes in platelet ultrastructure.
- Molecular analysis - Some families with severe platelet function disorders may wish to identify molecular defects for antenatal diagnosis e.g. Down’s syndrome may cause platelet defects.