LABUPDATE no. 53

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COLLAGEN-BINDING ASSAY AS PART OF WORK-UP FOR VON WILLEBRAND DISEASE

(VWF: CB ELISA COLLAGEN TYPE 1)

Von Willebrand disease (VWD) is the most commonly diagnosed inherited bleeding disorder, with a reported prevalence of approximately one in 1 000 persons. Individuals with VWD have defects in, or reduced levels of, Von Willebrand factor (VWF).Von Willebrand factor plays an important role in haemostasis – it acts as a carrier protein for coagulation factor VIII and facilitates platelet vessel wall adhesion, as well as platelet-platelet aggregation.

TABLE 1: CLASSIFICATION OF VWD

Type 1:	Mild quantitative defect Decreased amount of VWF
Type 2:	Qualitative/functional defect Decrease activity • 2A: Impaired multimerisation (loss of HMWM) • 2B: Hyper functional platelet binding (loss of HMWM) • 2M: Decreased GP1b binding • 2N: Decreased factor VIII binding
Type 3:	Severe total quantitative defect No VWF produced

LABORATORY DIAGNOSIS OF VON WILLEBRAND DISEASE

The initial Von Willebrand screen is composed of a three-test panel for the diagnosis or exclusion of VWD. This includes the following tests: VWF: Ag, VWF: RCo and factor VIII level. As a quantitative disorder, type 1 VWD is identified by reduced levels of VWF, with normal VWF activity. Thus, the VWF: Ag and VWF activity are reduced in proportion. This equal decrease in VWF levels and activity is expressed in terms of assay ratios. The ratio expected in type 1 VWD is above 0.7 (VWF: RCo/VWF: Ag).

Type 2 VWD is defined by qualitative VWF defects. The levels of VWF thus do not correspond with the VWF activity, resulting in a discrepant VWF: RCo/VWF: Ag ratio of less than 0.7. The collagen-binding assay (VWF: CB) is indicated in the work-up for patients with possibly type 2 VWD. Thus, the collagen-binding assay will be performed once a discrepant VWF: RCo/VWF: Ag ratio of less than 0.7 is detected. The VWF: CB measures the binding of high molecular weight multimers (HMWM) to collagen and is therefore sensitive to VWD subtypes characterised by the absence of larger VWF multimers, allowing it to distinguish between type 2 VWD subtypes. A VWF: CB/VWF: Ag ratio of less than 0.7 is indicative of either type 2A or type 2B VWD.

A four-test panel is performed at Ampath to aid in the diagnosis of Von Willebrand disease.

TABLE 2: ADDITIONAL INFORMATION

Mnemonic	VWCB
Specimen type	Venous blood
Container	Citrate tube
Volume required	Nine parts venous blood drawn into one part 3.2% trisodium citrate solution
Transport	To reach the lab within four hours; if not possible, the sample should be centrifuge, freeze and transport frozen.
Turnaround time	72 hours
Indications	Patients (paediatric or adult) with the following: a family history of bleeding, mucosal bleeding, easy bruising, epistaxis, gingival bleeding, surgical bleeding and heavy menstrual bleeding.