Thromboelastography: a more accurate assessment of global hemostasis

Hedyeh Shafi, Oxana Tcherniantchouk, D. Joe Chaffin, Holli Mason, and Ellen Klapper

A 47-year-old male with acute myeloid leukemia underwent resection of a paraspinous mass. Preoperative laboratory study results were as follows: white blood cell count, $2.6 \times 10^9/L$; hematocrit (Hct), 29%; platelet (PLT) count, $878 \times 10^9/L$; prothrombin time, 17.2 seconds (normal, 11.9-14.4 sec); and partial thromboplastin time, 41 seconds (normal, 22-37 sec). Intraoperatively, hemostasis was difficult to achieve. Two units of plasma and one plateletpheresis were transfused. Postoperatively, incisional bleeding continued and Hct decreased to 24%. Bleeding in the setting of thrombocytosis ($921 \times 10^9/L$), minimally prolonged prothrombin time (16.6 sec), and mildly elevated fibrinogen concentration (420 mg/dL) prompted a transfusion medicine consultation.

To assess the coagulation system, thromboelastograph (TEG 5000, Haemonetics, Braintree, MA) was obtained. TEG monitors the mechanical properties of the developing clot and subsequent lysis. Movement of an immersed transducer transmits a signal that generates a hemostasis profile. Initial TEG showed normal thrombin generation (R), but clot lysis indices (LY30 = 9.5% and CI > 1) suggested early secondary fibrinolysis, commonly seen in early disseminated intravascular coagulation (DIC). To prevent development of overt DIC, treatment with low-dose subcutaneous heparin was recommended. Four hours after heparin administration, repeat TEG showed LY30 normalized to 0%, suggesting cessation of the fibrinolytic phase of DIC. However, elevated angle and MA/G indicated higher fibrin(ogen) stabilization and PLT function, suggesting hypercoagulability. The patient received subcutaneous heparin every 12 hours for 48 hours. His bleeding resolved and he was discharged on Postoperative Day 4.

This case demonstrates the clinical utility of thromboelastography. Routine laboratory testing did not suggest DIC, and transfusion of plasma and PLTs did not lead to clinical improvement; TEG evaluation allowed a more accurate assessment of all phases of coagulation, which revealed incipient DIC. As a result, more appropriate therapy was instituted with a successful outcome.

CONFLICT OF INTEREST

None.

From the Department of Pathology and Laboratory Medicine, Cedars-Sinai Medical Center, Los Angeles, California.

Address reprint requests to: Hedyeh Shafi, MD, Department of Pathology and Laboratory Medicine, Cedars-Sinai Medical Center, 8700 Beverly Boulevard, Room 1680, Los Angeles, CA 90048; e-mail: hedyeh.shafi@cshs.org.

Received for publication December 14, 2012; revision received February 18, 2013, and accepted February 20, 2013.

doi: 10.1111/trf.12196

TRANSFUSION 2013;53:2605.