

Coagulation tests affected by acute phase reactants such as CRP and factor VIII

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Activated partial thromboplastin time (PTT) is routinely used to assess intrinsic coagulation factor deficiency and to monitor heparin effect. PTT, as well as prothrombin time (PT), is used as basic coagulation testing to assess risk for bleeding. Some PTT reagents are very sensitive to the presence of C-reactive protein (CRP) depending on the kind of factor XII activator and amount of phospholipids. Increased CRP due to acute phase reaction can falsely prolong PTT by CRP binding to phosphatidylcholine, one of the phospholipids in PTT reagents. Such an effect is more prominent when the specimen contains a therapeutic dose of heparin. Therefore, PTT should not be used to monitor heparin therapy when the patient is in acute phase reaction. The best monitoring test for heparin therapy is the anti-factor Xa assay, which is minimally affected by high bilirubin and free plasma hemoglobin. When CRP is present, PTT 1:1 mixing studies do not correct, which falsely suggests the presence of a circulating inhibitor in the setting of factor deficiency. CRP behaves like a lupus anticoagulant, which affects phospholipid-dependent clotting assays. Circulating thrombin activates factor VIII, substantially increasing its activity. When factor VIII is elevated as an acute phase reactant or thrombin is circulating, PTT is shortened. Therefore, intrinsic factor levels based on PTT are falsely elevated. In contrast, PT is not significantly affected by CRP-likely due to a higher amount of phospholipids in the reagent.

Biography

Jun Teruya obtained the M.D. and D.Sc. (Doctor of Science) degrees from Japan. After he became a clinical hematologist in Tokyo, he completed residency and fellowship training in Clinical Pathology and Blood Banking/Transfusion Medicine at Massachusetts General Hospital, Harvard Medical School, Boston. He is currently tenured Professor of Pathology & Immunology, Pediatrics, and Medicine, and Vice Chairman for Education at Baylor College of Medicine and Division Director of Transfusion Medicine & Coagulation at Texas Children's Hospital. He has published more than 90 articles in coagulation and blood banking. In addition, he has received numerous teaching awards from medical students and residents.

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