Abstract

Introduction Heparin is a common anticoagulant prescribed to many heart and surgical patients. These patients may develop antibodies to platelet factor 4 (PF4) and heparin complexes, which may lead to severe thrombocytopenia and deep vein thrombosis (DVT). The implementation of a rapid and automated laboratory test that can detect PF4-H complexes qualitatively, can assist physicians in screening for HIT or heparin-induced thrombocytopenia and decide whether or not to halt the heparin dosage. The purpose of the study is to validate the HemosIL HIT-Ab (PF4-H) Assay on the ACL TOP 750, determine the sensitivities and specificities of three HIT methods (ACL TOP, PIFA, and ELISA), and compare them to sensitivity and specificity of the confirmatory serotonin release assay (SRA), which is considered the gold standard.

Objectives The aims of the study were to perform an instrument validation and calibration of the HemosIL HIT-Ab (PF4-H) Assay in the ACL TOP 750 Analyzer and to compare the sensitivities and specificities of the three HIT tests (HemosIL HIT-Ab (PF4-H) Assay, PIFA Heparin/PF4 Assay, and Immucor PF4 ELISA) versus the gold standard Serotonin Release Assay (SRA) performed in ARUP Laboratories and versus each other.

Methods The HemosIL HIT-Ab (PF4-H) Assay was validated on the ACL TOP 750 using calibrators, controls, and samples from UF Pathology Laboratories and ARUP Laboratories that were previously tested for the HIT-Ab IgG via an ELISA method. Results were entered in a Data Collection Sheet. A 2x2 Data Conversion Table in Microsoft Excel was used to calculate the sensitivities and specificities for each assay and EP Evaluator was used to calculate mean, standard deviation, %CV, sensitivity, specificity, positive predictive value, and negative predictive value.

Results A total of 116 samples were assayed using the HemosIL HIT-Ab (PF4-H) Assay on the ACL TOP 750 and the PIFA Heparin/PF4 Rapid Assay. Overall, there were 125 positive tests and 255 negative tests for anti-PF4-H (ACL TOP: 39 positive, 77 negative; PIFA: 11 positive, 105 negative; ELISA: 60 positive, 56 negative). There were 15 positive and 17 negative for the SRA. The comparison between the ACL TOP and SRA had a sensitivity of 80.0% and specificity of 35.3%. ELISA vs. SRA had a sensitivity of 100.0%, but had a 0.0% specificity. The PIFA vs. SRA correlation had a sensitivity of 0.0% and specificity of 88.2%. The ACL TOP versus UF Health's current HIT ELISA method had a good comparison as well with a sensitivity of 61.7% and a specificity of 96.4%.

Conclusion The three HIT methods (ACL TOP, ELISA, and PIFA) compared to the SRA showed that the ACL TOP had a good positive agreement, but poor negative agreement, however, the ACL TOP had a very good negative agreement with the ELISA method. The implementation of the new HIT-Ab assay will benefit the institution's standard practice of care because it proved to be a reliable test. The high negative predictive value in the HemosIL HIT-Ab test may assist physicians in the rule out of HIT amongst HIT-suspected patients. The PIFA cartridge test had an overall poor performance with no positive agreement with the SRA and poor sensitivity versus the ACL TOP and ELISA methods.