



Comparison of Two Anti-Xa Heparin Assays That Use a Single (Hybrid) Calibration Curve for Unfractionated and Low Molecular Weight Heparin



McGlasson DL¹, Fritsma GA²
¹59th Clinical Research Division, Wilford Hall Medical Center, Lackland AFB, TX
²Laboratory Medicine, University of Alabama at Birmingham, Birmingham, AL, USA



Introduction

- We compared the ability of Rotachrom anti-Xa (Diagnostics Stago), and Biophen Heparin 6® (Aniara) chromogenic anti-Xa assays to monitor unfractionated heparin (UFH) and low molecular weight heparin (LMWH)
- Partial thromboplastin time (PTT) is commonly used to monitor UFH therapy but is unreliable in LMWH therapy
We used single *hybrid* calibration sets to prepare a single curve for LMWH and UFH; many laboratories currently maintain separate curves for UFH and LMWH

Subjects and Specimens

- We randomly selected and consented forty patients receiving enoxaparin (LMWH) and 40 UFH patients
 - LMWH: 20 males, 20 females, 26-91 years old
 - UFH: 20 males, 20 females, 20-85 years old
- Whole blood was collected with a single atraumatic venipuncture and mixed 9:1 with 3.2% sodium citrate
- Collection tubes were non-wettable, siliconized glass (BD Vacutainer® Systems)

Subjects' Conditions

- Pre-existing conditions included coronary disease, antiphospholipid antibody syndrome, deep vein thrombosis, pulmonary embolism, recurrent spontaneous abortion
- Some patients were receiving oral anticoagulant

Sample Management

- Platelet-poor plasma (PPP) was prepared by centrifuging at 2500g for 15 minutes generating a plasma platelet count <10,000/uL
- PPP was separated and stored at -70°C until testing
- Samples were thawed 5 minutes at 37°C and mixed just prior to testing

Assays and Analyzer

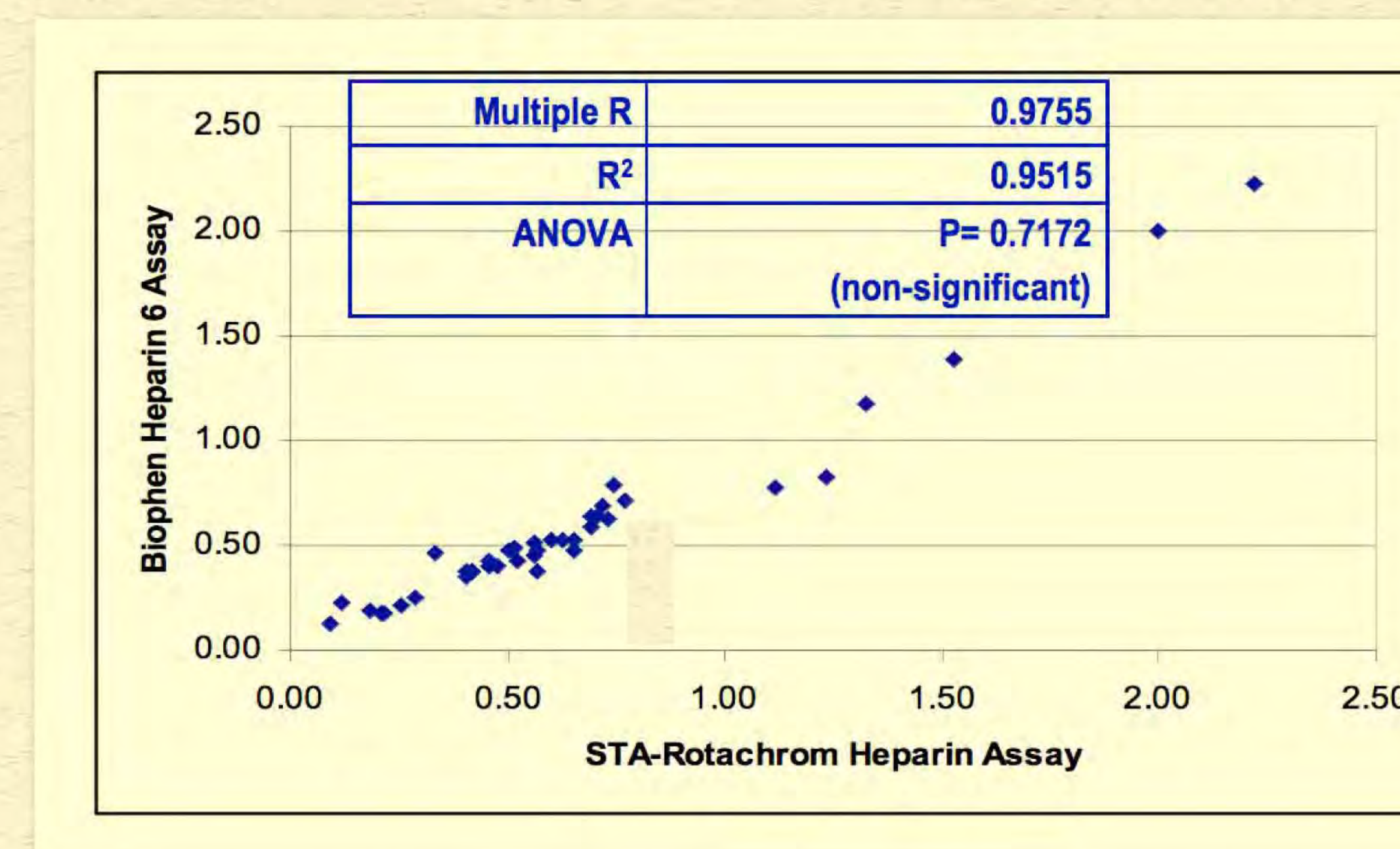
- STA-Rotachrom® Heparin Assay, Diagnostic Stago, Inc.
 - We *combined* kit calibrators for UFH (STA-Hepanorm® 3 & 6) and LMWH (HBPM® 0, 9 & 18) to provide a single hybrid curve
- Aniara Biophen Heparin 6® chromogenic anti Xa assay
 - Kit calibrators provide both UFH and LMWH at 0, 0.38, 0.77, 1.14, & 1.5 U/mL in a single curve
- Assays from subjects receiving LMWH or UFH were compared using single *hybrid* curves for both methods
- Analyzer for all assays was a Diagnostica Stago STA-R® automated coagulation analyzer

Data Reduction

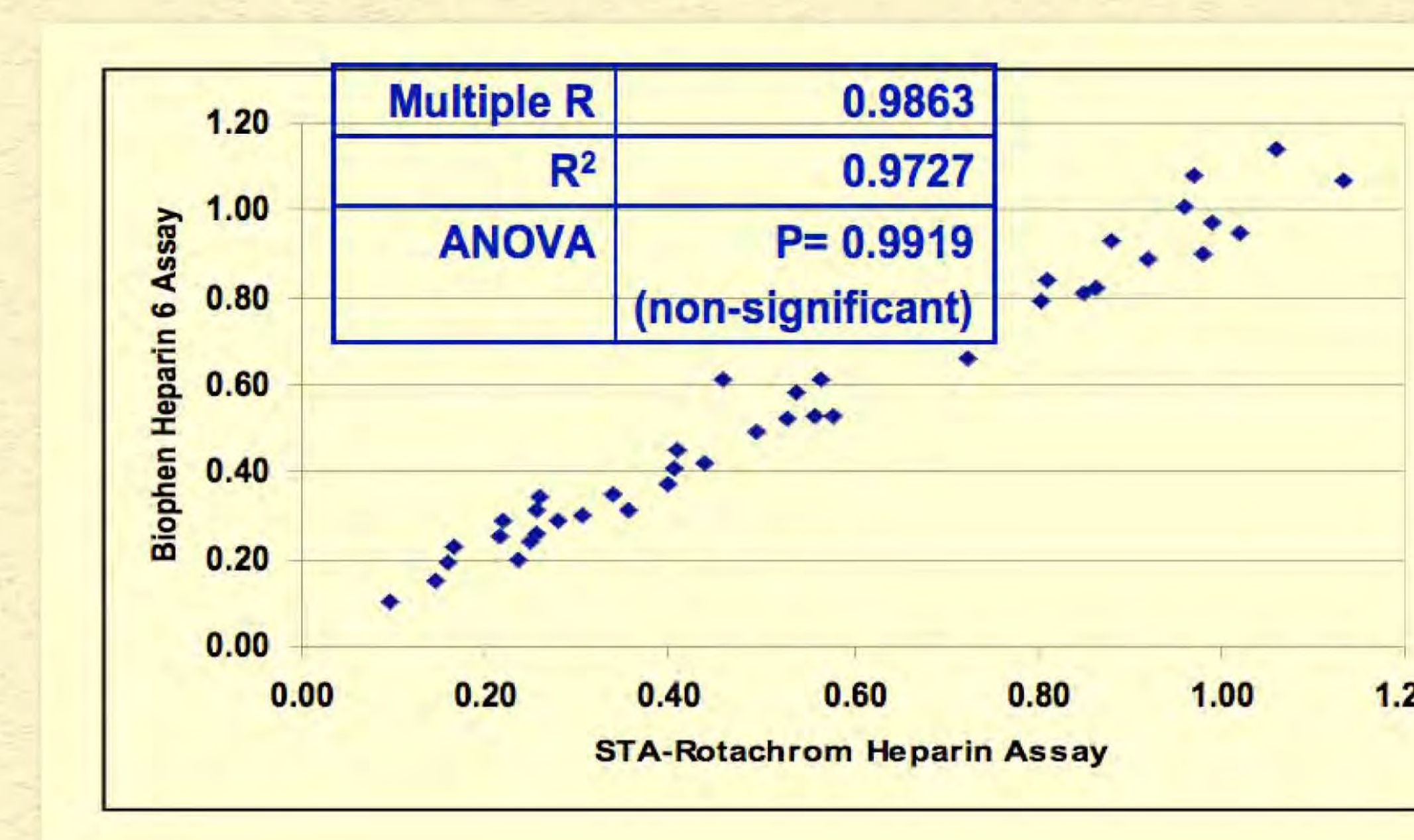
- Data was analyzed using descriptive statistics, regression and ANOVA
- LMWH range: 0.09-1.13 U/mL
- UFH range: 0.09-2.2 U/mL
- Protocol was approved through the local IRB under the tenets of the Helsinki protocol for human subjects experimentation and monitored through the US Air Force Surgeon General Office

This information is for education only and is not a product endorsement

Comparison of UFH Assays



Comparison of LMWH Assays



Discussion

- Chromogenic anti-Xa heparin assay results for UFH and LMWH were equivalent by ANOVA and regression analysis
- A hybrid calibration curve provides valid LMWH and UFH results

Bibliography

- McGlasson DL. Monitoring unfractionated heparin and low molecular weight heparin anticoagulation with an anti-Xa chromogenic assay using a single calibration curve. Lab Medicine 2005;36:297-9.
- McGlasson DL, Kaczor DA, Krasuski RA, et al. Effects of pre-analytical variables on the anti-Fxa chromogenic assay when monitoring unfractionated heparin and low molecular weight heparin anticoagulation. Blood Coag Fibrinolysis 2005;16:173-6.
- Meyers BL, Plumhoff EA, Gastineau DA, et al. A heparin assay system capable of measuring unfractionated heparin and LMWH using the same standard curve. Blood 1998;92:Suppl 1:123b
- Adcock DM, Kressin DC, Marlar RA, et al. Minimum volume requirements for routine coagulation testing: Dependence on citrate concentrations. Am J Clin Pathol 1998;109:595-9.



7768 Service Center Drive • West Chester OH 45069

Phone: 513.770.1991

Toll Free: 866.783.3797

Fax: 513.573.9241

Email: info@aniara.com

www.aniara.com

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