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Letters to the Editor

Four Different High-Sensitivity Cardiac Troponin Assays With Important Analytical Performance Differences

To the Editor:

The proposed common cutoff of 5 ng/L for both high-sensitivity cardiac troponin T (hs-cTnT) and high-sensitivity cardiac troponin I (hs-cTnI) assays to rule out myocardial infarction (MI) is supported by expert opinion and clinical studies.[1,2] Notwithstanding the ease of using a single cutoff for all high-sensitivity cardiac troponin (hs-cTn) assays, this may not be the most optimal approach. Moreover, this common threshold may confuse some clinicians.

Importantly, there are differences between cTnT and cTnI (2 different proteins) and even between cTnI assays, as there is no standardization between assays. Previously, we have illustrated that different reagent lots of cTn from the same manufacturer can yield widely different precision profiles, cautioning the use of small concentration changes to either rule in or rule out MI.[3] This was followed by additional studies illustrating the safety of using assay-specific concentration cutoffs that can be monitored in the clinical laboratory as opposed to using a low cTn concentration alone for early decision making.[4] In the present study, we assess the agreement and reproducibility of cTn results across 4 different hs-cTn assays: Siemens Dimension EXL hs-cTnI, Roche Cobas hs-cTnT, Siemens ADVIA Centaur hs-cTnI, and Abbott ARCHITECT hs-cTnI (i1000 and i2000 instruments) (for manufacturer listed analytical sensitivity, precision, 99th percentiles, see http://www.ifcc.org/media/477656/high-sensitivity-cardiac-troponin-i-and-t-assay-analytical-characteristics-designated-by-manufacturer-v012019.pdf).

Briefly, leftover lithium heparin plasma with hs-cTnI concentrations (Abbott) between 4-14 ng/L (Pool 1) and 15-100 ng/L (Pool 2) was constructed and stored (−20°C) before testing. The material was treated the same (1 h thaw, 10 hand inversions for mixing, 10-minute centrifugation@2300 g), with Pool 1 aliquoted into 36 cups and tested, followed by Pool 2 aliquoted into 36 cups and tested. The number of replicates was based on the lowest number of tests in 1 package on board the instrument to prevent any variation from different reagent packs (EXL reagent-wedge = 36 tests, ARCHITECTi1000 = 100 tests, ADVIA Centaur = 100 tests, Cobas e602 = 200 tests, ARCHTIECTi2000 = 500 tests) with testing completed within approximately 1 hour.

For Pool 1, Abbott platforms yielded an hs-cTnI concentration range from 3.6 to 5.5 ng/L, lower than the ADVIA Centaur (range: 5.7-7.6 ng/L), EXL (range: 6.5-8.0 ng/L), and Roche hs-cTnT (range: 26.1-27.4 ng/L) (Fig. 1). This pattern was also evident for Pool 2 (Abbott hs-cTnI range: 17.3-26.4 ng/L; ADVIA range: 25.8-33.5 ng/L; EXL range: 27.2-31.3 ng/L), with some differences in hs-cTnI repeat concentrations exceeding 6 ng/L, a concentration change proposed to rule in MI (Fig. 1A). The range of concentrations for Pool 2 for Roche hs-cTnT was 49.4-52.3 ng/L.

These data indicate that a 5 ng/L concentration obtained using Abbott hs-cTnI reagents and platforms can be significantly different from concentrations obtained with Siemens and Roche hs-cTn assays and instruments, with different imprecision profiles also limiting common change criteria used for ruling in and/or ruling out MI.

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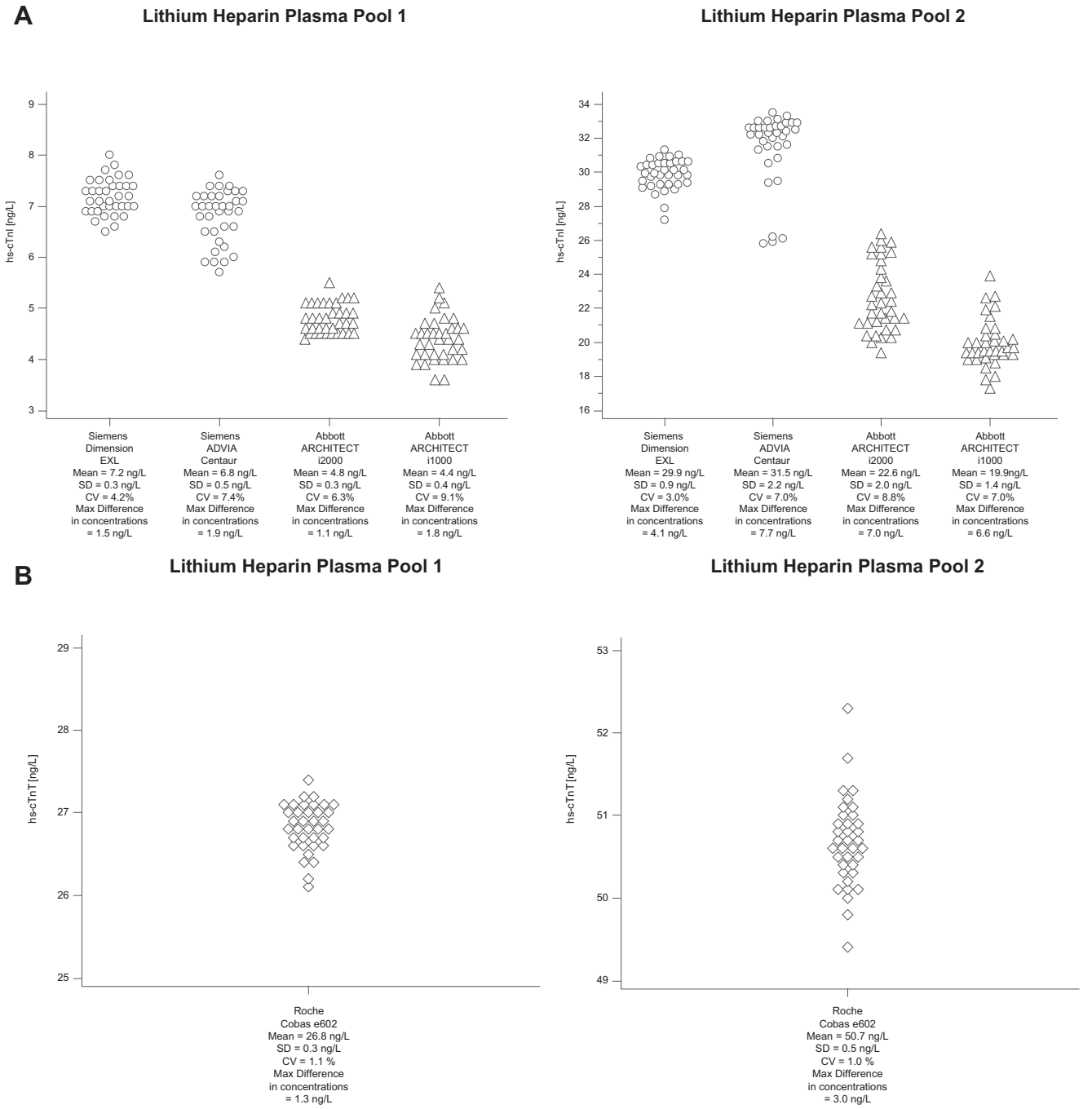

Figure 1. Two different lithium heparin plasma pools (1 and 2), measured for high-sensitivity cardiac troponin I (hs-cTnI) with the Siemens EXL analyzer, Siemens ADVIA Centaur analyzer, and Abbott ARCHITECT i2000 and i1000 analyzers (**A**) and for high-sensitivity cardiac troponin T (hs-cTnT) with the Roche Cobas e602 analyzer (**B**). CV, coefficient of variation; SD, standard deviation.

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