Characteristics of the cardiac troponin I assay on the Immulite 2000 analyzer

Citation for published version (APA):

Document status and date:
Published: 01/01/2002

Document Version:
Publisher’s PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:
• A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
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rials (data not shown). However, the prior negative bias of the IgM was overcompensated for; when the re-
vised reagent set (which contained
INOVA’s in-house secondary cali-
brators traceable to the GM-200 ma-
terial) was compared with the previ-
sion lot (no. 170264), we found the fo-
llowing bias: \( y = 2.45x - 16 \) MPL
\( (r = 0.95); \) Fig. 1B). Comparison of the
revised lot and our last lot (170105) that was based on the prior GM-100 standards (170355) showed a slope
>1.0 and a negative intercept (Fig. 1C).

A semiquantitative assay with cat-
egorical limits (i.e., negative, low, medium, high positive) requires consis-
tency across reagent lots. The
INOVA product insert suggests that results <12.5 MPL be classified as
negative, results \( \geq 12.5 \) to 20 MPL be classified as indeterminate, and
results >20 MPL be reported as posi-
tive (with 20–80 MPL as low/med-
dium and >80 MPL as high). For the
last 397 patients that we tested with
LAPL-GM-100 reagent sets, results for 31% of the patients were
>20 MPL. Extrapolating from panels A
and C in Fig. 1 would suggest that this percentage would have been
16% with lot no. 170264 and 27%
with lot no. 170355.

We appreciate that INOVA has
listened to our concerns, but we feel
it is important to alert the users of these products to the potential need to
readjust their cutoff values when
systematic changes occur with new
lots of reagents.

Reference
1. Wilson WA, Gharavi AE, Kolek T, Lockshin MD, Branch DW, Piette JC, et al. International con-
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report of an international workshop. Arthritis

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troponin concentration higher than the 99th percentile of a reference control group is one of the most specific (biochemical) markers of myocardial infarction. The maximum allowable imprecision at this decision limit has arbitrarily been set at a CV of 10% (1, 2), although it is not stated whether the 10% relates to total CV. Because an increasing number of nonstandardized commercial methods for the determination of cardiac troponin I (cTnI) are available, the analytical characteristics of every assay need to be established and published (1, 3). We describe the characteristics of the Immulite 2000 cTnI assay manufactured by Diagnostic Products Corporation.

The Immulite 2000 cTnI sandwich assay uses a monoclonal binding antibody and an alkaline phosphatase-conjugated polyclonal tracer antibody. Both antibodies recognize epitopes between amino acids 33 and 110 of cTnI. After incubation, excess conjugate is removed and chemiluminescent substrate is added. Chemiluminescence is proportional to the concentration of cTnI in the sample.

We assessed the detection limit of the assay by measuring 20 times a cTnI-free calibrator supplied by DPC. Each result was <0.01 μg/L. Therefore, the detection limit, defined as the signal 2 SD above the mean of the analyte-free calibrator, is <0.02 μg/L. To determine the 99th percentile of a control group, we analyzed heparinized plasma from 315 healthy volunteers from the outpatient clinic (approximately equal numbers of males and females, almost exclusively Caucasians). A total of 308 samples (98%) had cTnI concentrations <0.01 μg/L, and 7 samples contained 0.03–0.33 μg/L cTnI. The 99% limit was calculated to be 0.32 μg/L. The authors of another study, with 117 participants, reported the 99% limit, measured in serum on the Immulite analyzer, as 0.48 μg/L (4). Immulite serum cTnI values are 5–10% higher than those measured in heparin plasma (4, 5).

In accordance with the NCCLS EP5-T2 guideline (6), we analyzed five pools of heparinized plasma in duplicate once a day over 20 days and constructed an imprecision profile in the lower assay range. Our results (Fig. 1) are similar to those described previously for the Immulite analyzer (4, 5). A total CV of 10% was reached at a concentration of 0.7 μg/L. However, considering the 99th percentile found in the reference population, we arbitrarily chose a cutoff value of 0.4 μg/L at a CV of 12% for routine clinical practice to increase the sensitivity of the assay for detection of minimal cardiac damage.

In summary, the Immulite 2000 cTnI assay is analytically suited for the triage of patients presenting with symptoms of myocardial damage. Like many other commercial troponin assays (7), its precision at low troponin concentrations is unsatisfactory, so future generations of the assay need to have improved analytical sensitivity.

We thank DPC Nederland (Breda, The Netherlands) for the cTnI reagent sets used in this study.

References

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Reliable Measurement of Glycated Hemoglobin in Frozen Blood Samples: Implications for Epidemiologic Studies

To the Editor:
Appropriately reliable estimates of the quantitative importance of various risk factors for chronic diseases and of the nature of any interactions between them may require epidemiologic studies involving several thousand “cases” of a disease. Blood-

Fig. 1. Precision profile of the Immulite 2000 cTnI assay.