Performance Evaluation of PATHFAST Instrument & Reagents of Mitsubishi Chemical Europe

Evaluation Site: Italy

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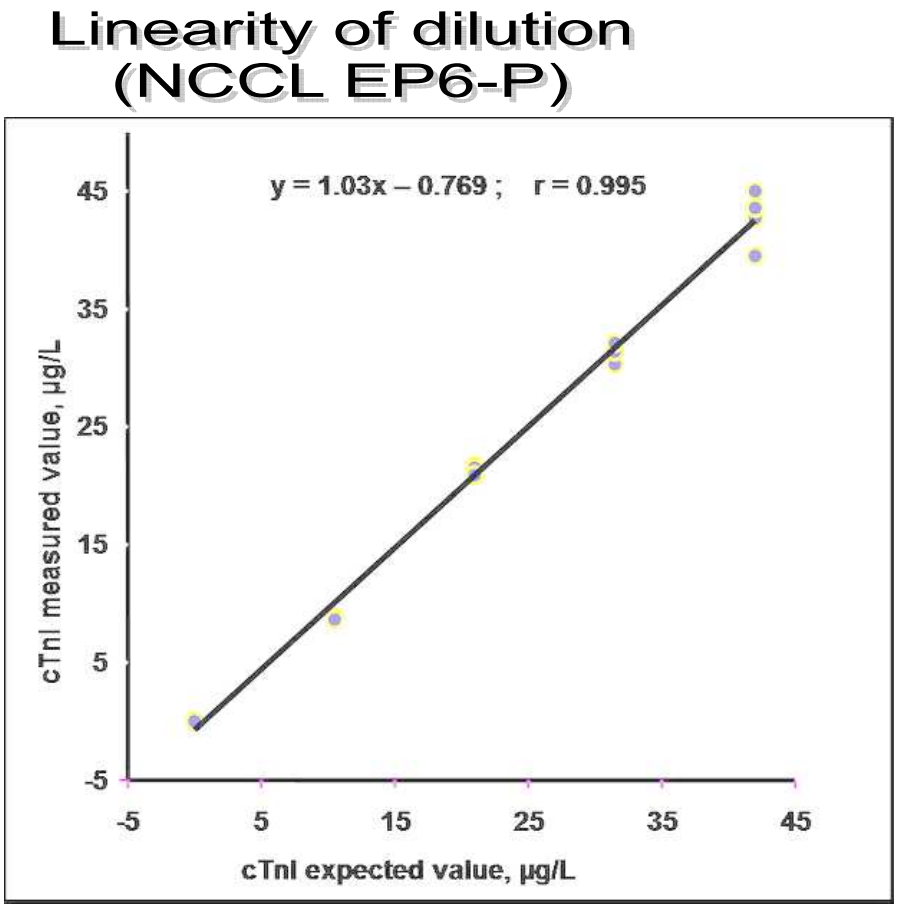
Testing of Reproducibility of PATHFAST cTnI

The study was carried out by testing two control samples and a plasma pool at a frequency of two runs/day on 20 consecutive days. For the entire evaluation, two different lots of reagents were used.

	cTnI µg/L	Intraassay CV (%)	Total CV (%)
QC 1	**0.66**	**5.8**	**6.3**
QC 2	**3.1**	**5.1**	**6.0**
Plasma pool	**6.0**	**4.5**	**6.4**

Testing of Linearity of dilution of PATHFAST cTnI (CLSI Protocol EP 6-P)



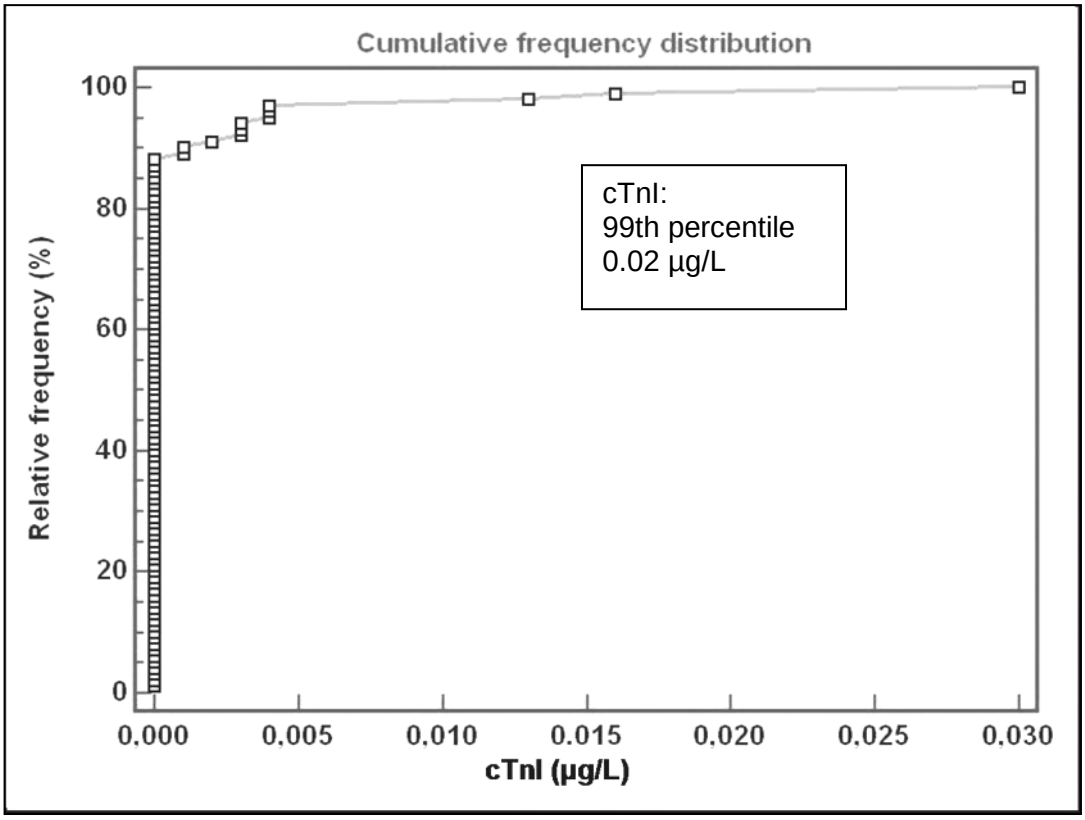
Lithium heparin plasma
lack of Linear Fit Test: Accept
F = 2.33
P = 0.1

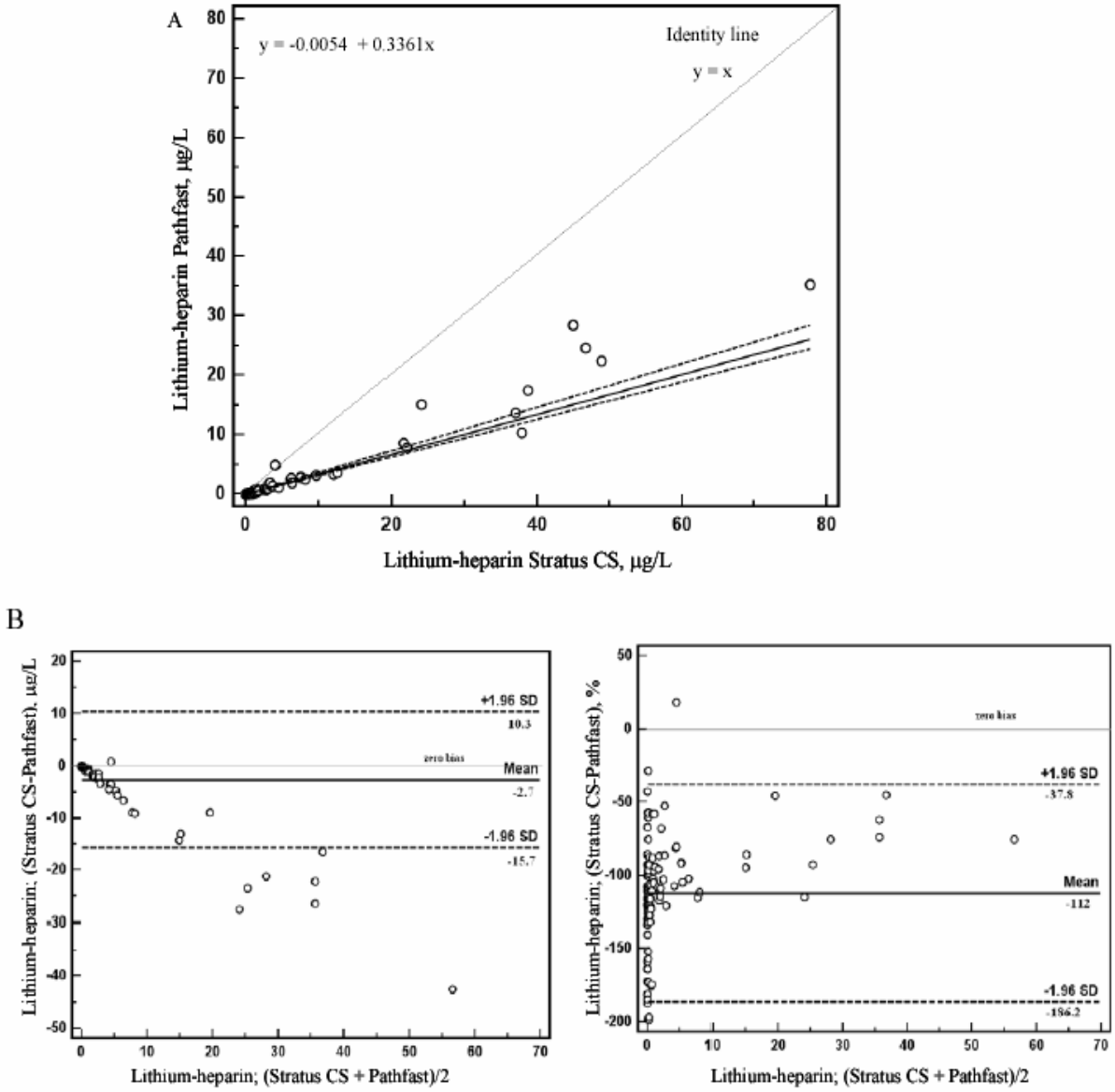
Testing Impact of Pre-analytical Factors on PATHFAST cTnI

A: Whole blood EDTA
B: Serum
C: Lithium heparin plasma
D: EDTA Plasma

Sample size : 160		
Anova on log-transformed data		
F-ratio : 0.010		
Significance level : P = 0.999		
Factor	n	Geom. mean
(1) A	40	0.6305
(2) B	40	0.6328
(3) C	40	0.6781
(4) D	40	0.6303

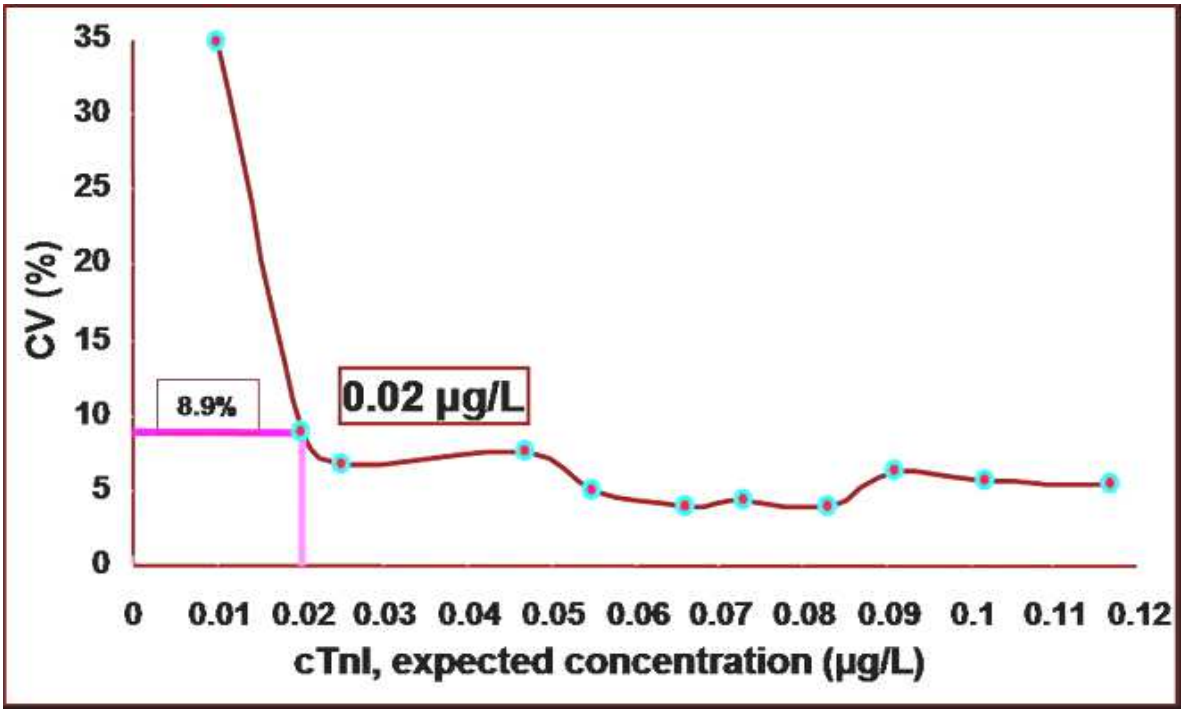
Distribution of cTnI values in healthy subjects

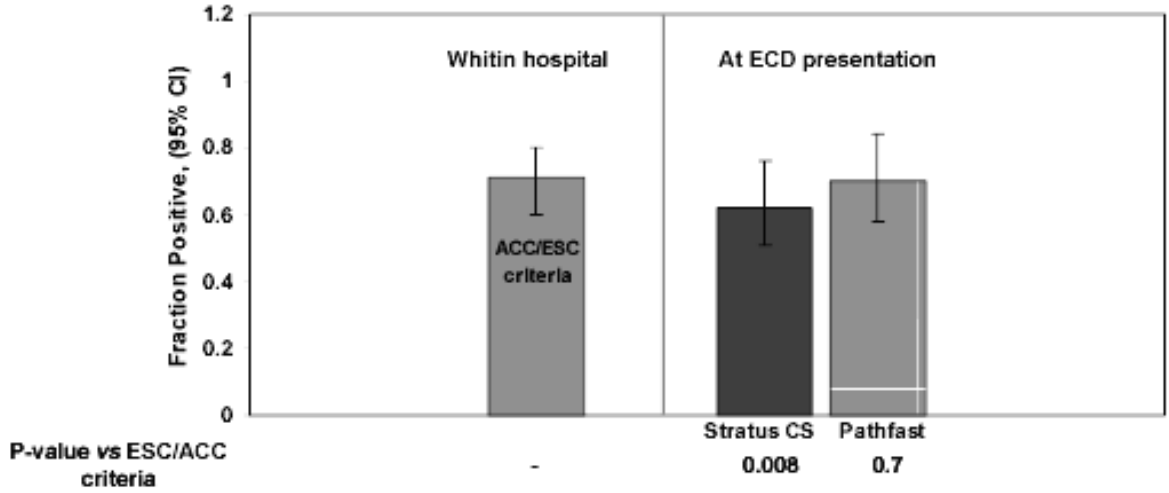




Scatter diagram of the Passing and Bablok regression (A) and Bland-Altman difference plots (B) between 115 lithium heparin plasma samples; cTnI PATHFAST vs. Dade Behring Stratus CS. (A): Passing & Bablok method for comparison with the regression line (solid line), including confidence interval for the regression line (dashed lines) and identity line (x = y, grey line). Values are slope and intercept of the regression analysis.
(B): Bland-Altman difference plots: values are absolute (left panels), percentage bias (right panels) and 95% limits of agreement of bias (dashed lines).

cTnI Functional Sensitivity





Effect of the Dade Behring Stratus CS and PATHFAST cTnI methods on AMI positivity.

AMI positivity in ECD, according to Stratus CS (cTnI > 0.07 µg/L) and PATHFAST (cTnI >0.02 µg/L) cTnI decision limits, is compared with the final AMI positivity in hospital, according to ESC/ACC. Fraction positive with 95% CI (error bars) are shown.

Conclusions of the four Italian investigators

Analytical and clinical performance of the PATHFAST (Mitsubishi) cTnI method.

The immunoassay use three monoclonal antibodies (amino-acids 41-49, 71-116, 163-210) and calibrators traceable to the SRM for Human-Cardiac-Troponin-Complex SRM 2921. The analytical performance was performed according to NCCLS/CLSI guidelines. The diagnostic accuracy for an early diagnosis of myocardial damage was compared with those of the Stratus CS method from 62 AMI patients.

Results. cTnI concentrations of 0.66, 3.1, 6.0 μg/L showed a total CV=6.3, 6.0, 6.4%; the lower concentration with a CV <10% was 0.02 μg/L (8.9% CV). Detection limit=0.0017μg/L. There was no effect (p=0.9) of anticoagulant type in 40 whole blood–EDTA, serum, lithium-heparin-plasma, EDTA-plasma samples.

Linearity 0-42 μg/L: y=1.0301(±1.0)x–0.7688(±0.49); r^2=0.99; F=2.33; p=0.1.

Lithium-heparin plasma samples: Pathfast vs

- RxL (n.40): absolute bias=-6.1 (95% CI:-9.2 to -3); percentage bias=-103 (95% CI: -110 to -96); cTnI values: 0.004-27.4 μg/L; y=0.4194(±0.013)x- 0.2941(±0.25);Sy/x=0.9; r^2=0.98.
- CS (n.122): absolute bias=-2.5 (95% CI:-3.6 to -1.3); percentage bias=-105 (95% CI:-115 to -95); cTnI values: 0.001-35.3 μg/L; y=0.475(±0.009)x-0.1877(±0.12);Sy/x=0.8; r^2=0.98.

99th percentile of the distribution of cTnI concentrations in 100 healthy subjects=0.02 μg/L. The new method identified in Emergency/Cardiology-Department a greater number of AMI (n.60; 97%) compared to the CS methods (n.53; 85%).

Conclusion. The cTnI Pathfast method is sensitive, precise, suitable for use in an emergency context as Point-of-Care-testing. The 10% CV is equal to the 99th percentile of a reference caucasian population, so that this new cTnI method is in compliance with specifications of the ESC/ACC redefinition of AMI.