7th Annual Congress of the German United Society of Clinical Chemistry and Laboratory Medicine, September 29 – October 02, 2010, Mannheim, Germany

Use of PATHFAST cTnI assay for detection of myocardial infarction in patients presenting with symptoms suggestive of acute coronary syndromes at the emergency room

Poster E40

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Background

The measurement of troponin for the early diagnosis of acute myocardial infarction using point-of-care assays in patients presenting with chest pain at the emergency department is limited because commercially available point-of-care assays cannot provide the analytical imprecision and the diagnostic accuracy required by international guidelines.

Aim of the study

To evaluate the diagnostic performance of the quantitative point - of - care (POC) assay PATHFAST® cTnI (Mitsubishi, Japan) for early detection of non-ST segement myocardial infarction (NSTEMI) in patients presenting with acute chest pain at the emergency room.

Methods

We measured cardiac troponin I (cTnI) using PATHFAST® cTnI in serum samples of 193 consecutive patients admitted to a chest pain unit at a large medical school hospital in Germany. Blood sampling was done on admission, 3 and 6 hours after admission.

The results of the troponin measurements were interpreted with respect to the discharge diagnoses which were independently established during the clinical course of the patients. Patients with non-ST-elevation myocardial Infarction (NSTEMI, N = 72), unstable angina pectoris (uAP, N = 80), ST-elevation myocardial infarction (STEMI, N = 7), non cardiac chest pain (NCCP) (N = 29), and others (N = 5) were included.

Tab. 1: Discharge Diagnoses

Diagnoses	N
uAP	80
NSTEMI	72
STEMI	7
NCCP	29
others	5

Results

PATHFAST® cTnI concentrations ≥ 0.020 ng/ml (99th percentile cutoff) were obtained at admission, 3 hours and 6 hours in 50, 69, and 65 patients of 74 patients with NSTEMI, respectively. Sensitivities and specificities obtained from ROC analysis using the recommended 99th percentile concentration of 0,020 ng/ml as the medical decision cutoff value are displayed in Tab. 2. Fig. 1 shows the corresponding ROC curves.

Tab. 2: Sensitivity and specificity data for detection of NSTEMI (N = 74) from ROC analysis

	PATHFAST TnI (≥ 0.02 ng/ml)		
	Sensitivity (%)	Specificity (%)	cTnI ≥ 0,02 ng/ml N
At admission	82.4	92.7	50
3 hours after admission	91.9	96.3	69
6 hours after admission	90.3	93.6	65

Fig. 1: Comparison of ROC curves for PATHFAST cTnI (at admission (blue line), 3 hours after admission (brown line), 6 hours after admission (orange line), difference between troponin I concentration at admission and 3 hours after admission (green line))

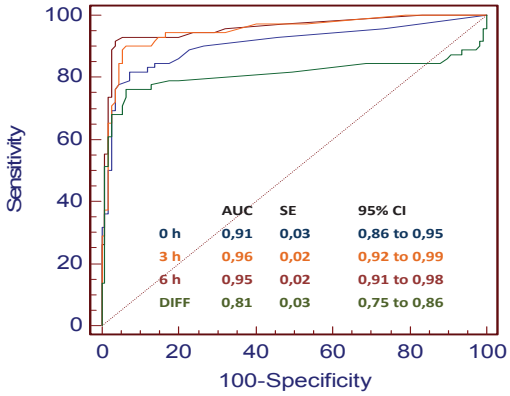
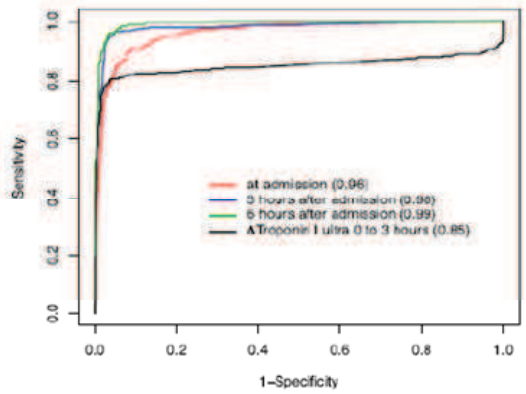


Fig. 2: Comparison of ROC curves for TnI Ultra
(adapted from Keller et al. N Engl J Med 2009;361:868-77)



Tab. 3: Comparison of predictive values

PATHFAST TnI Cutoff ≤ 0,02 ng/ml				TnI Ultra (Keller et al. NEJM 2009)			
Time	AUC	NPV(%)	PPV(%)	Time	AUC	NPV(%)	PPV(%)
at adm	0.91	86.1	93.4	-			
at 3 h	0.96	94.6	94.4	< 3 h	0.96	94.0	82.0
at 6 h	0.95	93.6	90.3	< 6 h	0.95	95.3	79.3
-				< 12 h	0.99	95.6	78.7

ROC analysis confirmed AUCs which are comparable to the high sensitivity TnI Ultra assay. PATHFAST cTnI revealed NPVs for the detection of NSTEMI at different time points which were similar to the corresponding values for TnI Ultra. On the other hand, TnI Ultra revealed markedly lower PPVs indicating a higher number of false positive results.

Conclusion

The most important result was the finding that NSTEMI was diagnosed already 3 hours after admission with the same diagnostic accuracy as after 6 hours.The findings suggested that PATHFAST cTnI which can also be used as POC test using whole blood samples may be able to improve the early diagnosis of acute myocardial infarction and save precious time until a definite diagnosis is established in emergency patients with acute chest pain.

Literature

F. Di Serio et al. Evaluation of analytical performance of the PATHFAST® cardiac troponin I. Clin Chem Lab Med 2009;47:829-33
Till Keller et al. Sensitive Torponin I Assay in Early Diagnosis of Acute Myocardial Infarction. N Engl J Med 2009;361:868-77