



THE ROLE OF BIOMARKERS IN EARLY DIAGNOSIS OF ACUTE KIDNEY INJURY IN PATIENTS WITH ACUTE CARDIAC DISEASE

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Background and Objective

- Early diagnosis of acute kidney injury (AKI) in cardiology is of paramount importance because of high level of severe complications in case of development of cardiorenal syndrome.
- Usage of markers of structural kidney damage in diagnosis and prognosis of AKI is widely discussed but till now their role isn't defined.
- The aim of the study was to explore the role of biomarkers in early diagnosis of AKI and their prognostic values in patients with acute cardiac disease in clinical practice

Inclusion criteria

Patients admitted in emergency department with acute decompensation of heart failure (ADHF) and with non-ST-elevation acute coronary syndrome (NSTE-ACS)).

Methods

- 109 patients were included: 51 with ADHF, 58 with NSTE-ACS.
- Detection and classification of acute kidney injury (AKI) according KDIGO Guidelines 2012¹
- Biomarkers of chronic heart failure (CHF) (NT-pro BNP in serum) and kidney damage (cystatin C in serum; NGAL, KIM-1 and IL-18 in the urine) were estimated.
- Mann-Whitney test was performed. P <0.05 was considered statistically significant

¹ KDIGO Clinical practice guideline for acute kidney injury. Kidney Int. 2012; 2(1): 1–141.

Results

- Patients with vs without AKI had higher levels of NGAL (344±308,8 vs 37,9±65,1 ng/ml, p <0.001) and KIM-1 (0,774±0,36 vs 0,402±0,59 ng/ml, p <0.01) in all groups (Tab. 1).
- Patients with NSTE-ACS with vs without AKI had higher level of NT-proBNP (12857,1±3108,8 vs 10134±2479,4, p<0.001), no difference was detected in ADHF group (Tab. 1).
- In course of ROC analyses NGAL and KIM-1 showed the best prognostic value (AUC value 0.948 and 0.760). The cut points for NGAL > 60,1 ng/ml (sensitivity - 87%, specificity - 92%) and KIM-1 > 0,519 ng/ml (sensitivity - 87%, specificity - 67%) were detected, coefficient of association φ was 0,781 and 0,555 respectively. (Fig. 1).
- Detection of two markers of structural renal damage (NGAL and/or KIM-1) in high-risk patients permits to diagnose 95% of AKI cases at admission.
- Patients with AKI and diagnostically significant levels of biomarkers had higher prevalence of CKD (p<0.01), acute heart failure, ADHF (p<0.05) vs others, inhospital mortality in this group was 29,8% (Fig. 2).

Tab 1. Biomarkers of acute kidney and cardiac injury in patients with acute cardiac disease according to development AKI

Biomarkers	ADHF		NSTE-ACS		ADHF+NSTE-ACS	
	AKI+ (n=27)	AKI- (n=24)	AKI+ (n=33)	AKI- (n=25)	AKI+ (n=60)	AKI- (n=49)
NGAL, ng/ml	307,8±262,1	21±16,5 ³	373,7±343,5	54±87,5 ³	344±308,8	37,9±65,1 ³
KIM-1, ng/ml	0,496±0,27	0,236±0,32 ²	0,982±0,24	0,561±0,74 ²	0,774±0,36	0,402±0,59 ³
IL-18, ng/ml	571,6±5,95	551,9±31,3 ²	569,8±12,7	539,5±25,2 ³	570,6±10,2	545,5±28,8 ³
Cystatin C, ng/ml	11344,9±3049,7	9839,6±3075,8 ²	12122,5±1549,7	9265,1±2564,6 ³	11772,6±2356,5	9546,5±2811,8 ³
NT-proBNP, φmol/ml	13251,1±4467,6	11836,7±2828,7	12857,1±3108,8	10134,2±2479,4 ³	13034,4±3751,9	10968,1±2765,4 ²

1p<0,05, 2p<0,01, 3p<0,001 – compared patients with AKI+ and AKI-.

Figure 1. ROC analyses.

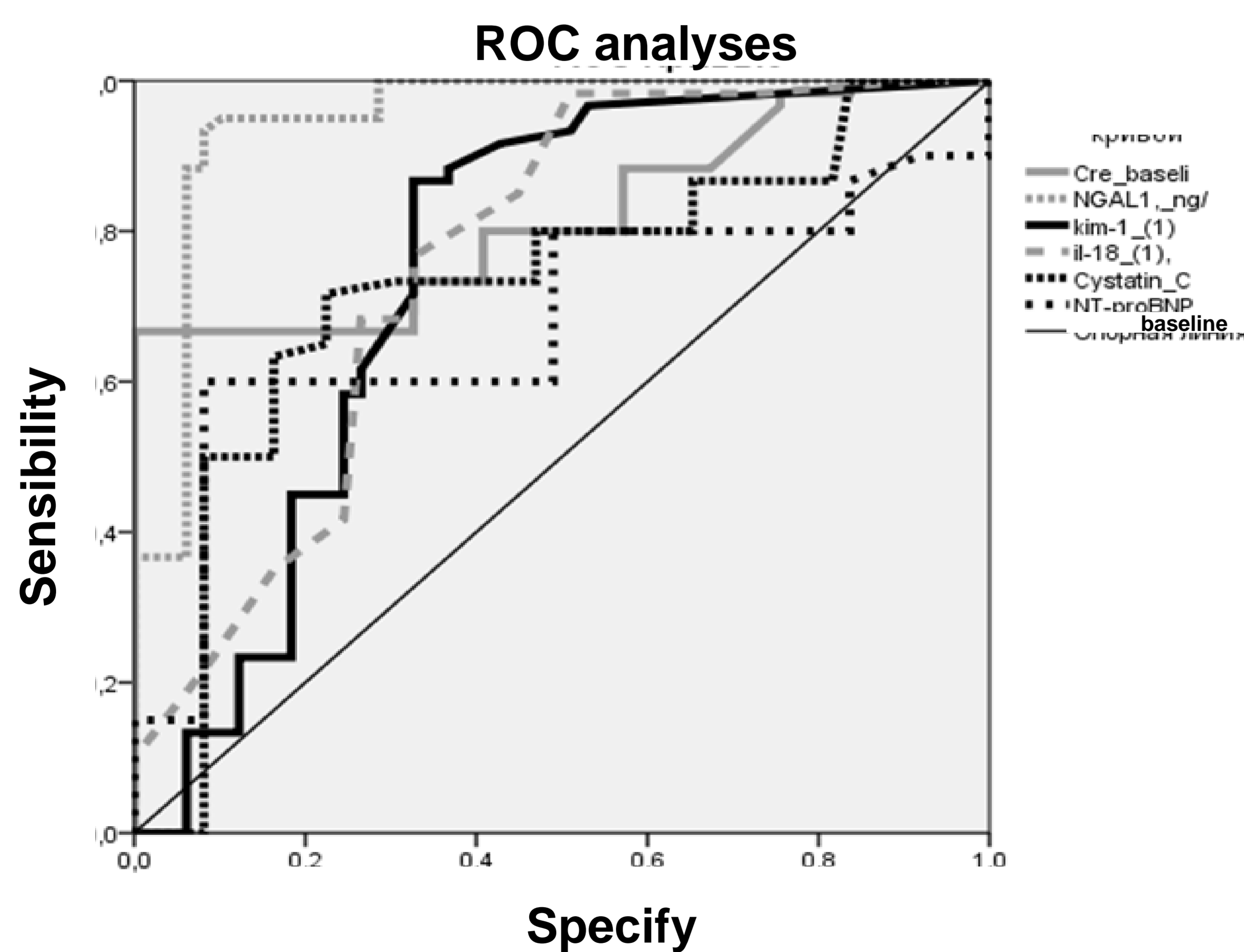
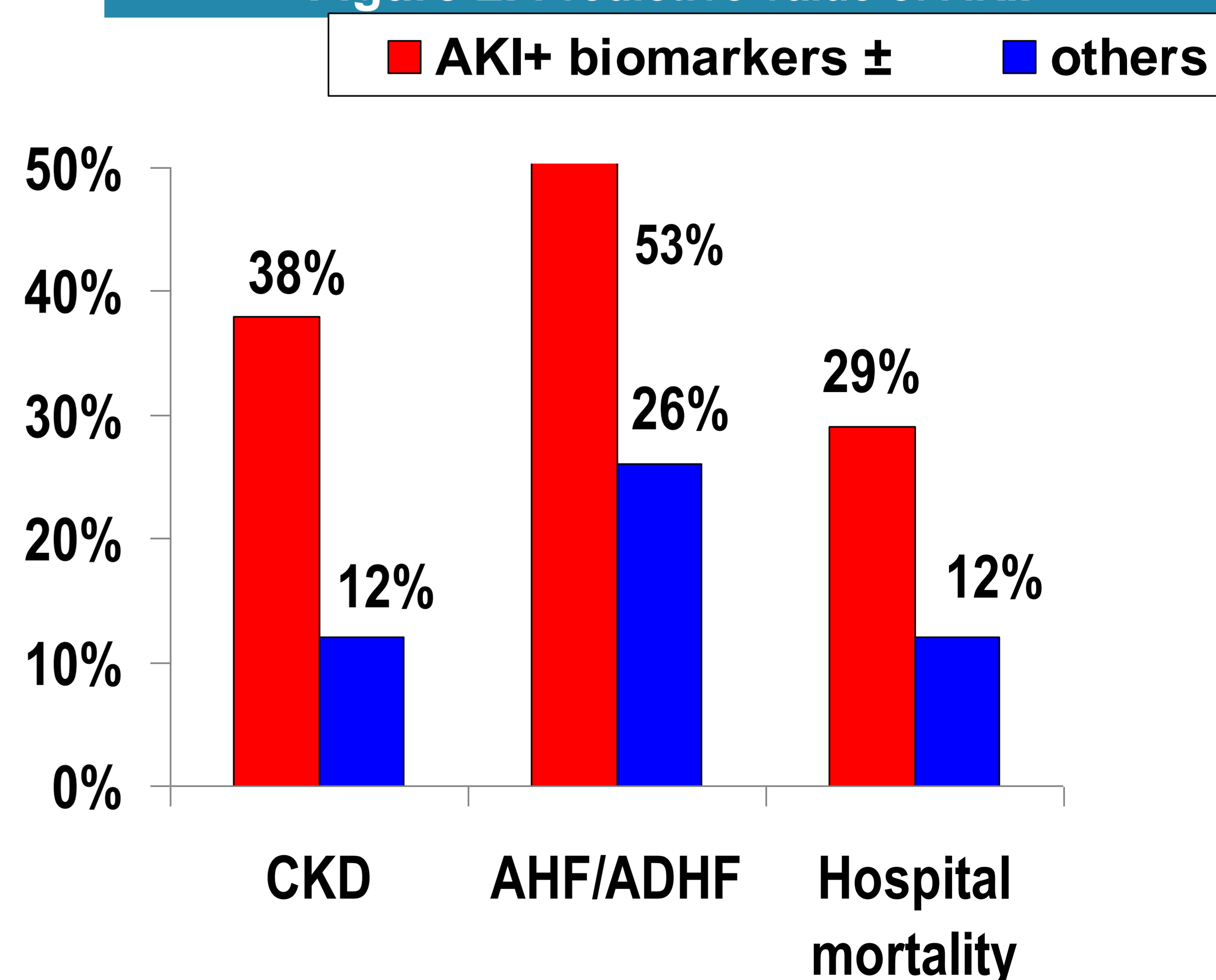


Figure 2. Predictive value of AKI.



Conclusions

- The simultaneously increased levels of biomarkers of structural kidney damage (KIM-1 > 0,519 ng/ml and NGAL > 60,1 ng/ml) is independent and strong predictor of AKI in patients with acute cardiac diseases.

Disclosure: none