Optimal high-sensitive cardiac troponin T cutoff-value for the early diagnosis of acute myocardial infarction in patients with chronic kidney disease

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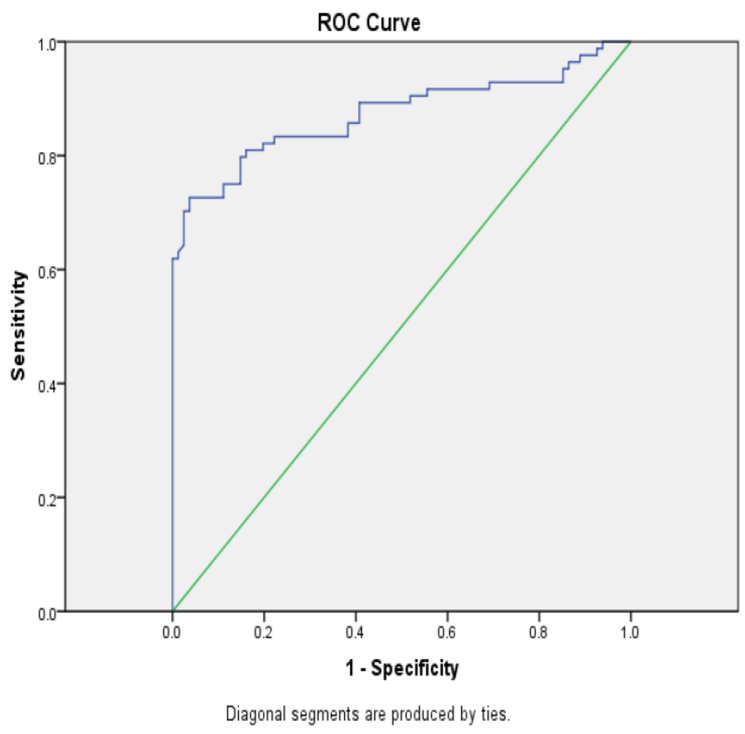
OBJECTIVES

High-sensitive cardiac troponin T (hs-TnT) is a critical biomarker in diagnosis of acute myocardial infarction (AMI). Patients with chronic kidney disease (CKD) are at high risk of AMI [1]. However, these individuals usually have elevated hs-TnT level even in the absence of AMI [2]. There is no current data on "expected" cutoff-value of hs-TnT in the context of CKD, or at different categories of glomerular filtration rate (GFR) [1]. The aim of our study is to explore an optimal cutoff-value of hs-TnT for the early diagnosis of AMI in CKD individuals.

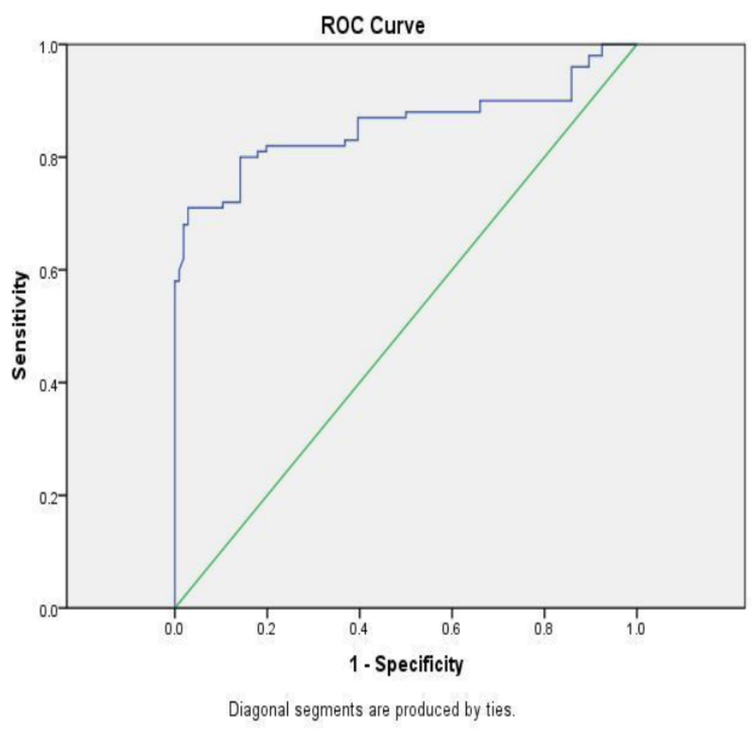
METHODS

We retrospectively collected the clinical characteristics and laboratory tests from database of West China Hospital from September 2010 to June 2014. 336 patients were enrolled. Patients with diagnosis of AMI and CKD simultaneously were assigned to the case group (CASE, n=168).The positive control group (PC, n=168) was composed of CKD patients without AMI. In addition, 168 patients with neither AMI nor CKD were identified as negative control group (NC) to compare hs-TnT level with PC group. Subgroup analysis was carried out on CKD 4 stage [15<eGFR≤30ml/(min·1.73m2)] non-dialysis patients. Binary logistic regression was used to evaluate the risk factors of AMI. Receiver operating characteristic (ROC) curve was adopted to derive the optimal cutoff-value.



hs-TnT (ng/l)	Sensitivity (%)	Specificity (%)	AUC	95%CI
267.70	72.60	96.30	0.873	0.832-0.913

Fig 1. ROC curve of hs-TnT in identifying subjects with AMI in CKD patients.



hs-TnT (ng/l)	Sensitivity (%)	Specificity (%)	AUC	95%CI
266.35	71.00	97.20	0.856	0.799-0.913

Fig 2.ROC curve of hs-TnT in identifying subjects with AMI in subgroup of CKD4 stage.

RESULTS

hs-TnT level in CASE and PC were 972.80(174.00-3611.50) ng/l and 52.00(32.70-83.20) ng/l, respectively. CASE group had higher hs-TnT level compared with PC group(P<0.001). hs-TnT level in NC was 9.50(6.60-14.40) ng/l, which was evidently lower compared with PC group, P<0.001.Older age and higher hs-TnT level were independent risk factors for AMI. In CKD patients, the optimal cutoff-value of hs-TnT for diagnosis of AMI was 267.7 ng/l. Sensitivity and specificity were 72.6% and 96.3%, respectively. The areas under the curve was 0.873 (95%CI 0.832-0.913) (Fig 1). In the subgroup of CKD4 stage patients, the cutoff-value appeared to be an hs-TnT level of 266.35ng/l with 71.0% sensitivity and 97.2% specificity and AUC was 0.856(95%CI 0.799-0.913) (Fig 2).

CONCLUSIONS

Patients with CKD have elevated hs-TnT level even in the absence of AMI. When AMI occurred, hs-TnT level increased obviously in these individuals. The optimal cutoff-value of hs-TnT for diagnosis of AMI in CKD patients is 267.7ng/l.

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