Clinical relevance of high-sensitive Troponin T in cardiovascular disease

Akademisk avhandling

Kommer att offentligen försvaras i Östra aulan, Östra Sjukhuset, 416 85 Göteborg, med avsikt att vid Sahlgrenska akademin vid Göteborgs Universitet avlägga medicine doktorsexamen måndagen den 4 maj 2015 klockan 09:00 av Christian Bjurman

Fakultetsopponent:
Gerhard Wikström, Institutionen för medicinska vetenskaper, Uppsala Universitet

Avhandlingen baseras på följande delarbeten:


IV. Bjurman C, Zywczyk M, Lindahl B, Carlsson T, Johanson P, Petzold M, Fu ML, Hammarsten O. Decreased admissions and hospital costs with a neutral effect on mortality following lowering of the Troponin T cut-off point to the 99th percentile. (manuscript)
Clinical relevance of high-sensitive Troponin T in cardiovascular disease

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ABSTRACT

Background and aims: Troponin T (hs-cTnT) is a cardiac damage marker used in the diagnosis of non-ST 
segment elevation myocardial infarction (NSTEMI) and for prognostic assessment. Clinical decision-making 
should ideally be based on evidence. We therefore studied the prognostic significance of small changes in the 
level of hs-cTnT in patients with NSTEMI, the effects of renal insufficiency on levels of cardiac biomarkers, 
a risk assessment model including age, cystatin C (CysC) and hs-cTnT in heart failure, and whether a 
lowered hs-cTnT diagnostic cutoff value, from 40 ng/L to 14 ng/L (the 99th percentile), results in mortality 
changes and increasing health care expenditure.

Methods: Four study cohorts were used. Multiple biomarkers and clinical data were combined. The first 
study included 1178 patients with NSTEMI. The second study included 489 patients with different degrees of 
renal function who were referred for glomerular filtration rate (GFR) measurement, either by Cr51-EDTA or 
Iohexol clearance. The third study included 124 patients with heart failure and reduced left ventricular 
ejection fraction (HFREF). The fourth study included 39001 visits to the emergency department (ED) by 
patients with chest pain or dyspnea with at least one hs-cTnT measurement at the local hospital, before and 
after lowering the hs-cTnT diagnostic cutoff from 40 ng/L to 14 ng/L.

Results: In NSTEMI, a six-hour relative hs-cTnT change <20% was observed in 25 % of NSTEMI patients 
and was linked to increased mortality. Compared with patients with normal kidney function, the estimated 
increase in the cardiac biomarkers at a GFR of 15 ml/min/1.73m2 varied from two-fold to 15-fold. In 
HFREF, a risk score including age, cystatin C (CysC) and hs-cTnT stratified mortality. The mortality among 
patients with chest pain or dyspnea in the ED did not change after lowering of the hs-cTnT cut-off from 40 
ng/L to 14 ng/L; however, admissions and hospital costs decreased.

Conclusions: In NSTEMI, a small change in the hs-cTnT level was common and was linked to increased 
mortality. Troponin I levels are less dependent on the glomerular filtration rate compared with other studied 
cardiac biomarkers. A combination of different biomarkers might improve prognostic assessments in 
HFREF. Mortality did not change but hospital admissions were reduced after lowering of the hs-cTnT cutoff.

Key words: biomarkers, prognostic score, mortality, heart failure, myocardial infarction, renal dysfunction
