Karolinska Institutet

Institutionen för Medicin, Huddinge

Assessment of patients with symptoms suggestive of acute coronary syndrome – The use of high sensitive cardiac troponin T and a risk score

AKADEMISK AVHANDLING
som för avläggande av medicine doktorsexamen vid Karolinska Institutet offentligen försvaras i Föreläsningssalen C1.87, Karolinska Universitetssjukhuset, Huddinge.

Fredagen den 1 november 2013, kl 09.00

av
Dina Melki
Läkare

Huvudhandledare:
Docent Tomas Jernberg
Karolinska Institutet
Institutionen för Medicin, Huddinge

Bihandledare:
Medicine doktor Suzanne Lind
Karolinska Institutet
Institutionen för Laboratoriemedicin

Fakultetsopponent:
Professor Johan Herlitz
Borås Högskola
Institutionen för Vårdvetenskap

Betygsnämnd:
Professor Leif Svensson
Karolinska Institutet
Institutionen för Klinisk Forskning och Utbildning, Södersjukhuset

Docent Johan Hulting
Karolinska Institutet
Institutionen för Klinisk Forskning och Utbildning, Södersjukhuset

Professor Anders Larsson
Uppsala Universitet
Institutionen för Medicinska Vetenskaper

Stockholm 2013

Assessment of patients with symptoms suggestive of acute coronary syndrome -The use of high sensitive cardiac troponin T and a risk score

Abstract

The aim of this thesis was to evaluate patients with symptoms suggestive of acute coronary syndrome with regard to early diagnosis and prognosis by the use of high sensitive cardiac troponin T and a risk score:

In paper I, the early diagnostic value of high sensitive cardiac troponin T (hs-cTnT) was compared with conventional cardiac troponin assays in 233 patients with symptoms suggestive of acute coronary syndrome (ACS). When acute myocardial infarction (MI) was defined according to conventional cardiac troponins and the lowest level with a coefficient of variation (CV) ≤ 10% for each method was used as decision limit, hs-cTnT had a higher sensitivity than the conventional cardiac troponins. When acute MI was defined according to hs-cTnT, hs-cTnT performed better than the conventional cardiac troponins at different decision limits and had the largest Area Under Curve (AUC) in ROC analysis.

In paper II, the prognostic value of hs-cTnT was compared with conventional cardiac troponin assays in 231 patients with symptoms suggestive of ACS. When the lowest level with a CV ≤ 10% for each method was used as decision limit, hs-cTnT identified more high-risk patients. After adjusting for differences in clinical baseline characteristics, hs-cTnT and N-terminal pro B-type natriuretic peptide (NT-proBNP) were independently associated with outcome. By combining hs-cTnT and NT-proBNP, patients could be divided into low-, intermediate- and high-risk groups.

In paper III, HEART score was validated in 410 consecutive patients with chest pain. Of 247 (60.2 %) patients in HEART score 0-3, one patient (0.4%) had a combined endpoint. Of 144 (35.1 %) patients in heart score 4-6, 19 (13.2 %) patients had a combined endpoint. Of 19 (4.6%) patients in HEART score 7-10, 10 (52.6 %) patients had a combined endpoint. Of all admitted patients, 34.3 % had a HEART score 0-3.

In paper IV: 48,594 patients admitted because of symptoms suggestive of ACS were included to examine the effects of introducing hs-cTnT into clinical practice. 25 % had hs-cTnT < 14 ng/L (group 1), 22 % had hs-cTnT 14-49 ng/L (group 2) and 53 % had hs-cTnT ≥ 50 ng/L (group 3). From group 1 to 3, there was a stepwise increase with regard to proportion of patients with significant coronary stenoses, left ventricular systolic dysfunction and death during follow-up. Thus, the introduction of hs-cTnT has led to a large proportion of patients with minor cardiac troponin elevation (14-49 ng/L). The majority with minor elevation do not have myocardial infarction but are still at high risk. When dividing patients into 20 groups according to hs-cTnT level, the adjusted mortality started to increase at hs-cTnT level of 14 ng/L.

Conclusion: hs-cTnT improves early diagnosis and risk stratification compared with conventional cardiac troponin assays. An excellent risk prediction can be achieved by combining hs-cTnT and NT-proBNP in an easily used algorithm. The introduction of hs-cTnT has resulted in identification of a large population with only minor elevation of hs-cTnT (14-49 ng/L) but are still at high risk. HEART score may be a useful tool for evaluation of chest pain patients and identify a low-risk group in which admission and further investigations may not be necessary.

Key words: troponin, chest pain, acute coronary syndrome, risk scores.

ISBN 978-91-7549-326-8