Abstract: P3439

Causes of death in patients with chronic myocardial injury

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Topic(s):
Prevention – Cardiovascular Risk Assessment: Biomarkers

Citation:

Funding Acknowledgements:
None

Background/Introduction
Persistently elevated high-sensitivity cardiac troponin T (hs-cTnT) levels above the 99th percentile value indicate ongoing chronic myocardial injury which is associated with a high risk of death, heart failure, and myocardial infarction. No prior studies have thoroughly investigated the causes of death in patients with chronic myocardial injury.

Purpose
To investigate causes of death in patients with chronic myocardial injury.

Methods
In a cohort of 19,460 consecutive patients with chest pain and stable hs-cTnT levels measured concurrently from 2011 to 2014 at the Karolinska university hospital, of whom 1528 (7.9%) had myocardial injury, we included all patients who died during a mean follow-up of 4.0 ± 1.3 years. Incidence rates for cause-specific deaths were calculated within following categories of hs-cTnT levels: <5, 5-9, 10-14, 15-29, 30-49, and ≥50 ng/l. Logistic regression was used to estimate adjusted odds ratios (OR) with 95% confidence intervals (CI) for the association between hs-cTnT levels and the relation between cardiovascular (CV) and non-cardiovascular (non-cardiovascular) causes of death, for patients with hs-cTnT levels of 5-14, and >14 ng/l, respectively using patients with hs-cTnT levels <5 ng/l as referent.

Results
In total, 1577 patients (8.1%) were included, of whom 684 (43%) had chronic myocardial injury (i.e. hs-cTnT >14 ng/l). Higher hs-cTnT levels were associated with higher age at baseline and at death, male sex, kidney dysfunction and comorbidities. The yearly cardiovascular and non-cardiovascular death rates increased with increasing hs-cTnT levels from 0.07% and 0.4% (<5 ng/l), to 17% and 15% (≥50 ng/l), respectively. Corresponding rates for cancer death increased from 0.6% to 4.0%. The proportion of cardiovascular versus non-cardiovascular deaths increased with hs-cTnT levels (figure). Patients with hs-cTnT levels 5-14 ng/l were 87% more likely to die from cardiovascular causes compared with patients with hs-cTnT <5 ng/l (adjusted OR: 1.87, 95% CI: 1.24-2.80), while the risk was doubled in those with chronic myocardial injury (adjusted OR: 2.02, 95% CI: 1.29-3.15). The proportion of patients suffering from cardiovascular death increased with age in both women and men.

Conclusions
We found a gradual increase in the risk of cardiovascular death with increasing hs-cTnT levels, already below the 99th percentile value. Patients with chronic myocardial injury were twice as likely to die from cardiovascular causes compared with patients with undetectable troponin levels, with almost half of the patients dying cardiovascular death. Chronic myocardial injury is associated with a high risk of cardiovascular death.
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