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Safety and efficacy of high-sensitivity cardiac troponin for risk stratification in patients with suspected acute coronary syndrome

Authors:

On behalf: High-STEACS Investigators

Topic(s):
Acute Coronary Syndromes: Biomarkers

Citation:

Funding Acknowledgements:
British Heart Foundation

Background: Guidelines acknowledge the emerging role of high-sensitivity cardiac troponin (hs-cTn) assays for the risk stratification and rapid rule-out of myocardial infarction, but multiple approaches have been described. We previously demonstrated the utility of a single hs-cTnI concentration <5 ng/L at presentation to risk stratify patients with suspected acute coronary syndrome (ACS).

Purpose: To assess the safety and efficacy of a hs-cTnI concentration <5 ng/L at presentation in consecutive patients included in the High-STEACS (High-Sensitivity Troponin in the Evaluation of patients with Acute Coronary Syndrome) randomised controlled trial.

Methods: The High-STEACS trial was a stepped wedge cluster randomised controlled trial in ten hospitals across Scotland that included 48,282 patients in whom high-sensitivity cardiac troponin was requested by the attending clinician for evaluation of suspected ACS. Patients with ST-segment elevation myocardial infarction (STEMI) were excluded. We evaluated the negative predictive value (NPV) and sensitivity of a presentation hs-cTnI <5 ng/L for a composite outcome of type 1 myocardial infarction, or subsequent type 1 myocardial infarction or cardiac death at 30 days. To assess safety, we report the one-year risk of type 1 myocardial infarction or cardiac death. To assess efficacy, we report the proportion of patients with cardiac troponin <5 ng/L at presentation.

Results: We included 47,101 consecutive patients in the analysis (mean 61±17 years old, 47% female). Of these patients, 27,500 (58%) had a cardiac troponin <5 ng/L at presentation. Overall, 4,313/47,101 (9%) patients had a composite outcome at 30 days, but the event rate was only 0.4% in those with troponin <5 ng/L (98/27,500). The NPV for the composite outcome in those <5 ng/L was 99.7% (95% confidence intervals [CI] 99.6–99.7) and the sensitivity was 98.0% (95% CI 97.6–98.4). In those without evidence of myocardial injury at presentation (hs-cTnI <99thcentile), type 1 myocardial infarction or cardiac death at one year occurred in 197 (0.7%) patients with cardiac troponin <5 ng/L, compared to 647 (5.5%) of those =5 ng/L. The NPV was unchanged across all age groups, although efficacy fell as fewer older patients had hs-cTnI concentrations below the risk stratification threshold (see Figure).

Conclusion: A hs-cTnI concentration <5 ng/L at presentation identifies the majority of patients with suspected ACS as low-risk of early or late cardiac events. Although the proportion identified as low risk is reduced in older populations, the safety of this risk stratification approach is maintained across patients of all ages.
Abstract:
Safety and efficacy of high-sensitivity cardiac troponin for risk stratification in patients with suspected acute coronary syndrome

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