



FOCUS ON RESEARCH

High-sensitivity cardiac troponin on presentation to rule out myocardial infarction

Researchers

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Aim

To define the optimal approach to ruling out a diagnosis of heart attack (myocardial infarction) in patients with chest pain at the time of first presentation to the Emergency Department

Project Outline/Methodology

In 6,304 consecutive patients with chest pain presenting to secondary and tertiary care hospitals in Scotland and the United States, we measured a protein called cardiac troponin that is released from the heart when it is injured using a new more sensitive test. In two groups of patients, we determined the optimal concentration of troponin that would rule out the diagnosis of myocardial infarction with the greatest certainty.

Key Results

In the first cohort (n=4,870), there were 782 (16.1%) patients with myocardial infarction at presentation, and a further 32 (0.7%) myocardial infarcts and 75 (1.5%) cardiac deaths at 30 days. In patients without infarction at presentation, troponin concentrations were <5 ng/L in 2,311 (61%) patients which ruled out myocardial infarction with a certainty of 99.6%. This observation was consistent across groups stratified by age, sex, risk factors or prior cardiovascular disease. Across a second cohort (n=1,434), we validated this observation showing that troponin concentrations were <5 ng/L in 594 patients (56%) and this ruled out myocardial infarction up to 30 days later correctly 99.4% of patients. At one year, patients with troponin concentrations <5 ng/L had a 3-fold lower risk of myocardial infarction or cardiac death compared to those ≥5 ng/L.

Conclusions

Low plasma troponin concentrations identify two-thirds of patients at very low risk of cardiac events who could be safely discharged from hospital. Implementation of this approach has the potential to

reduce hospital admissions and will have major benefits for both patients and healthcare providers.

What does this study add to the field?

Low plasma cardiac troponin I concentrations at presentation can enable the immediate and safe discharge of two-thirds of patients with suspected heart attacks. This will have major benefits for both patients and healthcare providers.

Implications for Practice or Policy

Presentations with chest pain are a common cause of hospitalisation across the world and represent a major burden on health care resources. In the United Kingdom alone, chest pain is responsible for approximately 1 million visits to the Emergency Department each year. Although many of these patients may be suitable for direct discharge from the Emergency Department, current care pathways are unable to rule out myocardial infarction at presentation, and guidelines recommend serial troponin testing requiring hospital admission in the majority of patients. Given most of these patients do not have myocardial infarction; this approach leads to a large number of potentially avoidable hospital admissions. Using a new high-sensitivity cardiac troponin I assay, this study prospectively and systematically evaluated a range of troponin concentrations in all consecutive unselected patients with chest pain across different healthcare settings. It established a threshold (<5 ng/L) that identified a large proportion of patients at very low risk of cardiac events who were hospitalised, but could have been safely discharged.

Where to next?

We are currently evaluating the impact that implementation of this approach will have on hospital admissions and patient outcomes across 10 hospitals in Scotland in a step wedge cluster randomised controlled trial funded by the British Heart Foundation (PG/15/51/31596).

Further details from

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