

High Sensitivity Success for Achy Breaky Hearts



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Background

Cardiac troponin T and I are biological markers of cardiac muscle death that are released into the circulation when damage to cardiac muscle has occurred. The troponins are the recommended biomarkers for diagnosing myocardial infarction (MI) in chest pain of recent onset in low risk patients. High sensitivity (hs) troponin assays have been developed to detect lower levels of troponin in the blood earlier than older standard assays, leading to improved early detection of acute MI. Previously a 6 hour pathway was in use in Gloucestershire Hospitals NHS Foundation Trust (GHNHSFT), so patients would need to be admitted while waiting for their repeat troponin sample.

A 1 hour pathway, using the hs-cTnT (Elecys) assay and based on ESC^[1] recommendations, was validated by the laboratory and introduced in unscheduled care in 2018 for patients with suspected acute coronary syndrome (ACS) or who have cardiac sounding chest pain. The Troponin T interpretation flowchart in the Trust ACS pathway is shown in Figure 1.

Aims

- This audit aimed to assess:
 - ✓ Appropriateness of requesting
 - ✓ Pathway adherence
 - ✓ Long-term patient outcomes
 - ✓ Savings to the Trust and CCG

Method

Information Department data and the pathology LIMS were used to identify and assess 143 patients over four days in July 2018. Patients were followed-up for two years using the LIMS.

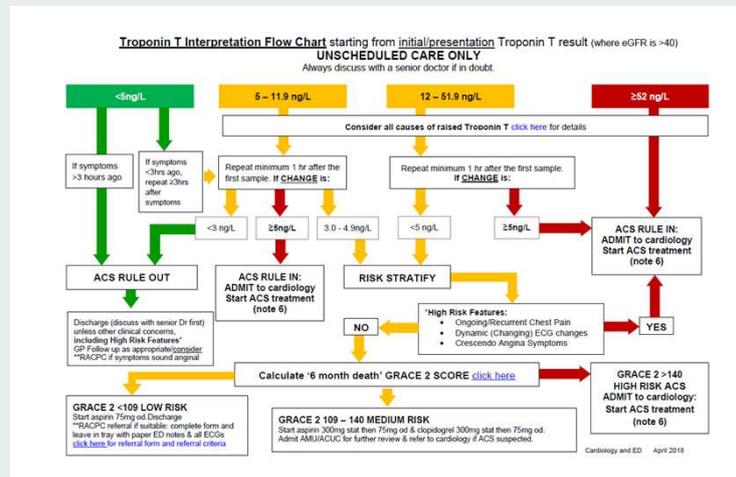


Figure 1: Acute coronary syndrome guidelines and cardiac chest pain pathway for patients presenting to unscheduled care at GHNHSFT (known as the ACS pathway).

Case studies: Who has this pathway helped?

- A 36 year old female presented to ED via 111 with chest pain. Her initial troponin T result was <5 ng/L so she could be safely discharged without being admitted for a second troponin T test. Two years later she was alive and well.
- An 89 year old male presented to ED with chest pain. His initial troponin T result was 28.7 ng/L; his follow-up troponin taken as part of the 1 hour pathway was 35.6 ng/L. As per the pathway, he was promptly admitted with a final diagnosis of acute subendocardial myocardial infarction.

Results

Was the request appropriate?

- Clinical details were used to assess whether the initial request for troponin T met the requesting guidelines.
- Overall, 91% of initial requests were appropriate. Inappropriate requests included patients presenting with seizures and arthritis.

Was the ACS pathway followed correctly?

Regardless of whether the initial troponin T request was appropriate, the pathway was followed correctly in the majority of cases (67.9%). However, this varied by hospital site (as shown in Figure 2) and whether the patient presented on a weekend or weekday: the pathway was far more likely to be followed incorrectly at the weekend in one site, whereas the percentages were more consistent in the other site.

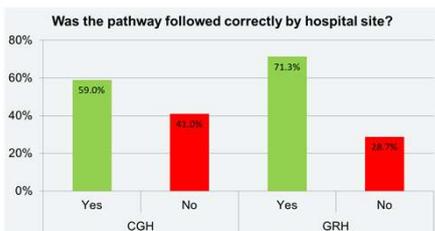


Figure 2: Chart showing whether the pathway from Figure 1 was followed correctly in each hospital site.

Should patients have been admitted, discharged or referred to cardiology for risk stratification based on their result(s)?

Patient management was assessed against the troponin T interpretation flow chart in the ACS pathway. The majority (71 patients) could be ruled out: the result(s) were consistent with a non-ACS cause of their symptoms, as shown in Figure 3.

Were patients ultimately admitted or discharged?

Ultimately, just over half of patients were admitted, as shown in Figure 4. Decisions would have been based on the patient's overall clinical picture, taking into account both their troponin T concentration(s) and any other cardiac or non-cardiac reasons for their presentation in ED. Of the 39 patients in Figure 3 who would have been in the risk stratification category based on their troponin T results, 30 (76.9%) were admitted and 9 (23.1%) were discharged.

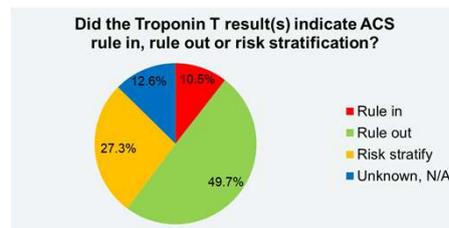


Figure 3: Patient management indicated by troponin T results. Note: "Unknown" refers to where no follow-up troponin T sample was taken after first was haemolysed or greater or equal to 5; "N/A" refers to situations where troponin T was not taken as part of the ACS pathway.

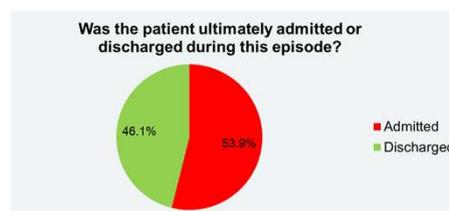


Figure 4: Patient outcomes, regardless of troponin T results

What were the long term patient outcomes?

- 71 patients had troponin T results that indicated discharge. However, 35% were admitted due to their overall clinical picture e.g. malignancy.
- All 46 discharged patients were still alive two years later. 1 of the 46 was diagnosed with heart failure. An additional 6 patients re-presented one or more times with chest pain: 5 had negative/non-significant increases in troponin T, while 1 required risk stratification and was appropriately discharged with referral to the rapid access chest pain clinic.

What are savings from introducing this pathway?

- The cost saving for the CCG for discharging patients who would otherwise be admitted to wait for troponin T results is estimated at £839,500/year.
- The Trust will save an estimated 4198 bed days/year.

Conclusion and recommendations:

- This audit supports the continued utilisation of this safe and effective risk stratification pathway for patients in unscheduled care.
- The pathway represented a significant saving to the Trust and CCG compared to the previous 6 hour pathway in savings both on the admission fee and in bed days.
- The site responsible for most cases where the pathway was not followed correctly will receive additional training to improve compliance.