Clinical Update: The Use of High Sensitivity Troponin T Assays

The current Troponin T assay is being replaced with a new more sensitive version of the assay on 15-06-11. The new test is called hs-TnT (high sensitivity Troponin T)

1. As with all Troponin assays the hs-TnT assay should only be performed if indicated by the presence of clinical features of acute coronary syndrome (ACS).

2. The new test has a limit of detection of 3 ng/L of Troponin T. The concentration units have been changed to ng/L units. The reported values are now 1000 X greater than the previous assay so that decimal places are no longer reported.

3. The increased sensitivity of the assay will yield detectable concentrations of TnT in many healthy individuals. Significant elevation of hs-TnT is now defined as a level greater than or equal to 14 ng/L (the 99th percentile). The concentration of > 14 ng/L should be regarded as the cutoff for a possible coronary event.

4. Elevated levels of hs-TnT should always be interpreted in the context of clinical presentation and assessment. Serial tests that demonstrate a significant increase in hs-TnT over a specified period of time support the diagnosis of acute ischaemic coronary event (S-T elevation myocardial infarct (STEMI) or Non-S-T elevation myocardial infarct (NSTEMI)).

5. Particular requirements include:

   • Serial measurements made at presentation and 6 hours post presentation.

   • If there is a high index of suspension the second serial measurements may be made > 3 hours after presentation or > 6 hours after onset of symptoms.

   • A serial measurement at 6 hours after presentation can help to rule out AMI when there is a low index of suspicion.

   • A change (increase) > or = 50% in the serial assay of TnT is consistent with an acute ischaemic coronary event (STEMI or NSTEMI).
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6. The increased sensitivity of hs-TnT may yield a chronic elevation of the TnT concentrations in stable coronary disease. These patients face an increased risk of future heart failure and CVD mortality, but hs-TnT should not show a significant increase between short-term serial measurements.

7. The assay may indicate unsuspected myocardial injury in other clinical conditions. This unsuspected elevation of TnT is due to subclinical myocardial injury and is not derived from non-cardiac sources. The concentration of TnT under many of these circumstances is often prognostic. The conditions that may cause these elevations of TnT include:

Renal failure, cardiac failure, pulmonary embolism, myocarditis, pericarditis, hypertrophic cardiomyopathy, tachyarrhythmia, bradyarrhythmia, cardiac procedures (surgery, pacing, ablation), cardiac infiltrative diseases, cardiac trauma, aortic dissection, stroke or subarachnoid haemorrhage, severe respiratory failure, severe sepsis, severe burns and extreme exertion.

In these situations the hs-TnT should not show a significant increase between serial measurements (unless it could be due to the acute onset or progression of one of these other conditions).
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Careful clinical history, examination, ECG, chest X-ray and investigations to diagnose other causes of chest pain and evaluate clinical likelihood of evolving ACS*

hs-troponin test all patients with suspected ACS

At presentation

<table>
<thead>
<tr>
<th>Negative</th>
<th>Positive</th>
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<tbody>
<tr>
<td>&lt;14 ng/L</td>
<td>&gt;14 ng/L</td>
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<tr>
<td>(&lt;99th percentile)</td>
<td>(&gt;99th percentile)</td>
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3 hours after presentation and at least 6 hours after the onset of symptoms in patients in whom there is a high index of suspicion of ACS

REPEAT TROPONIN

<table>
<thead>
<tr>
<th>Negative</th>
<th>Positive</th>
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<td>&gt;14 ng/L or &gt;50% increase</td>
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6 hours after presentation

Repeat troponin to evaluate cause of troponin elevation

| Myocardial Infarction (MI) unlikely: proceed to early ‘rule-out’ CAD testing |
| MI likely: seek cardiac consultation and further investigation |
| Not early MI: consider late MI or other causes of chronic troponin elevation |

ALGORITHM: HIGH SENSITIVITY TROPONIN T (hs-TNT) TESTING IN ACUTE CORONARY SYNDROME (ACS)**

* Substantial early elevation in hs-TnT may indicate evolving MI or other diagnoses associated with risk: Immediate evaluation is required. Management decisions should not be delayed for repeat hs-TnT testing at 6 hours

** Significant change: The Universal Definition of MI has recommended that a change of 20% from baseline is based on old assays. With the new High Sensitivity troponin assay, a change of 50% or more may be required to make a diagnosis of evolving MI. Conversely, diagnosis on a background of chronic elevation of hs-TnT (eg ≥ 50 ng/L) may warrant a lower threshold of % changes for diagnosis. Research, currently ongoing, will clarify these recommendations.

# based on NHF/CSANZ – National Heart Foundation/Cardiac Society Australia & New Zealand – April 2011