



New Sensitive Cardiac Troponin I Assay at New Milford Hospital

We are pleased to announce that the New Milford Hospital Laboratory will be performing a more sensitive assay for **cardiac troponin I (cTnI)**. The new **cTnI-Ultra** assay will be performed on the Siemens ADVIA Centaur XP immunoassay analyzer and will replace the less sensitive 2nd generation cTnI assay currently performed on the Dimension chemistry analyzer. The new assay is the same cTnI test that has been in use at Danbury Hospital since 2008 and this change is in line with our ongoing efforts to standardize laboratory testing across WCHN.

What are the benefits of changing to the new cTnI-ultra assay?

There are clinical benefits and consequences of using a more sensitive cardiac troponin assay. Because the Centaur cTnI-Ultra assay is a “3rd generation” assay, it is more sensitive than the current Dimension 2nd generation assay and can reliably detect very low levels of cTnI. Clinically, the ability to precisely measure these mildly elevated levels of cTnI improves the earlier diagnosis of acute coronary syndrome (ACS) in patients presenting soon after onset of symptoms and smaller infarcts can be detected. However, one must keep in mind that a more sensitive assay will also detect mild elevations of cTnI present in acute and chronic conditions other than ACS that may indicate subclinical myocardial injury. Although these elevations may or may not have immediate clinical significance, studies have shown mild cTnI elevations and even measurable levels of troponin below the 99thile cutoff to be prognostic for poor outcomes.

Are the values measured by the new cTnI-Ultra and the old cTnI assays the same?

No, they are not the same. Although the results from the Centaur and Dimension cTnI assays are comparable on a qualitative basis (negative vs. positive) and there is a rough correlation between the values produced by the two assays, cardiac troponin I assays are not sufficiently standardized to allow test results from different assays to be used interchangeably.

What is the clinical decision limit for the new cTnI-Ultra assay?

American College of Cardiology and American Heart Association guidelines^{1,2} recommend using the 99th percentile of cardiac troponin values measured in a healthy reference population with a given troponin assay as the clinical decision limit for detecting myocardial injury with that assay providing it is capable of measuring troponin with sufficient precision at this level ($\leq 10\%$ coefficient of variation). This 99th percentile value has been determined to be 0.04 ng/mL for the Centaur TnI Ultra 3rd generation assay. Therefore, cTnI results greater than 0.04 ng/mL will be flagged as elevated and should be considered to indicate the presence of myocardial injury; however, the mechanism of this injury may or may not be related to acute ischemic heart disease (see below). Please note that this 0.04 ng/mL decision value is considerably lower than the 0.59 ng/mL value that has been used as the upper reference limit for the current Dimension cTnI assay at New Milford Hospital. *[The 0.59 ng/mL value is based on the former WHO definition of AMI that relied on CK-MB values for diagnosis. The 99th percentile cTnI value for the Dimension assay is considerably lower at 0.07 ng/mL but this 2nd generation assay does not have sufficient precision at this level to allow routine use of this value as a clinical cut-off.]*

Key points to keep in mind when interpreting cardiac troponin results:

- The new Centaur cTnI-Ultra assay is more sensitive than the current Dimension cTnI assay and capable of detecting elevations earlier after myocardial injury.
- The *tissue* specificity of cTnI should not be confused with specificity for the mechanism of cardiac injury - an elevated cTnI result is not always due to ACS or ischemic coronary heart disease. Troponin elevations in the absence of overt ischemic heart disease have been documented in patients with sepsis, hypovolemia, atrial fibrillation, coronary vasospasm, myocarditis, cardiac trauma (contusion, cardioversion) heart failure, pulmonary embolism, drug cardiotoxicity (adriamycin, 5-FU, herceptin), rhabdomyolysis with cardiac injury, and renal failure. Troponin elevations have been found to be highly prognostic for both short-term and long-term outcomes in many of these disorders⁶⁻⁸.
- Serial levels of cTnI are helpful in assessing patients with a mild troponin elevation on presentation and a low-moderate pre-test probability of AMI. If levels of cTnI do not change appreciably between the initial sample on presentation and a second sample, AMI is very unlikely. A “delta change value” of 0.055 ng/mL has been proposed for the Centaur cTnI Ultra assay⁹.
- Elevations of cTnI in patients with chronic renal insufficiency but without ACS are well documented. Although the exact underlying mechanisms are unclear, these elevations have been shown to have prognostic value for future adverse outcomes.

When will the transition to the new cTnI-Ultra assay occur?

Beginning on May 30, 2013, all TnI orders for samples obtained on patients presenting to the ED will be tested with the new Centaur cTnI-Ultra assay. For continuity of care, all inpatients who were admitted before and had TnI measurements by the old Dimension assay will continue to be monitored with the same assay until discharge. [The Dimension cTnI assay will also be maintained as a “back-up” for the Centaur assay.]

Questions? Please contact Dr. Sal Sena at 203-739-7622.

References

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