



Troponin T 5th Generation – Bringing New Confidence in Cardiac Care

Effective Tuesday April 9th, the laboratories of UnityPoint Health – Des Moines will be converting from Roche Troponin T 4th Generation to the Roche Troponin T 5th Generation. The Roche Elecsys TnT Gen 5 STAT is the FIRST FDA-cleared highly sensitive troponin in US history.

Welcome to **In the Loop**, the newsletter from UnityPoint Health – Des Moines Laboratories.

The purpose of this newsletter is to distribute valuable information to our service area, including new test availability, test updates regarding methodology, specimen collection, and normal values.

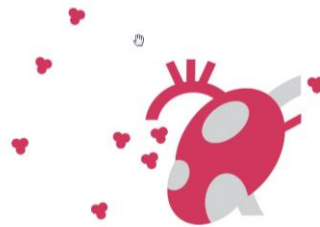
We may also include feature topics related to laboratory diagnostics and test utilization.

If you have suggestions for topics you would like to read about in the newsletter, please email Kimberly.VonAhsen@unitypoint.org

Background

The first troponin assays, which measure levels of cardiac troponin T or I in the blood, were approved for clinical use in the 1990s. Troponin is a structural component of heart muscle cells and is released into the bloodstream when the heart muscle is injured in some way.

Troponin T (TnT) is a protein released by the heart when heart tissue gets injured



TROPONIN T (TnT) PROTEIN

Troponin T is a myofibrillar protein found in striated musculature. There are 2 types of myofilament: a thick filament containing myosin and a thin filament consisting of 3 different proteins, namely actin, tropomyosin, and troponin. Troponin is itself a complex of 3 protein subunits, which are termed troponin T, troponin I, and troponin C:

- Troponin T binds the troponin complex to tropomyosin
- Troponin I inhibits actomyosin ATPase in relation to the calcium concentration
- Troponin C has 4 binding sites for calcium and mediates calcium dependency

Clinical Significance

Troponins are released during myocyte necrosis and/or increased permeability of the cell wall. Generally they are cardiac specific, however are not specific for myocardial infarction (MI).

5th Generation troponin T is a high-sensitivity troponin T test and is the biomarker of choice to test for possible myocardial injury. Elevation begins early after myocardial injury and may remain elevated for more than 14 days.

Interpretation and risk stratification requires the integration of clinical data.

Elevated values may not be due to acute myocardial infarction however may indicate myocardial injury (acute or chronic). A rising and/or falling pattern distinguishes acute

from chronic myocardial injury.

Patients with stable increases in 5th gen troponin are at increased long term risk; however, should not require hospitalization based solely on a single lab result.

Interpretation of Troponin 5th Generation results – consult Troponin 5th Gen Pathway Algorithm

Zero (0) hour result	Interpretation
F: ≤10ng/L M: ≤15ng/L & Pain onset >6 hrs	Acute myocardial injury ruled out
Other	Indeterminate: 2-hour test recommended
>100ng/L	Acute myocardial injury ruled in
Two (2) hour change	Interpretation
≤3 ng/L	Not changing: Acute myocardial injury ruled out
4-9ng/L	Indeterminate: 6-hour test recommended
≥10ng/L	Changing: Acute myocardial injury ruled in
Six (6) hour change	Interpretation
<12ng/L	Not changing: Acute myocardial injury ruled out
≥12ng/L	Changing: Acute myocardial injury ruled in

IMPORTANT TAKE AWAYS

- Numbers look bigger:** Change in units (ng/mL to ng/L). Troponin 5th Generation is reported in ng/L, which is 1000 times larger than the prior troponin tests, which were reported in ng/mL. i.e 4th Generation ≤0.01 ng/mL vs ≤10 ng/mL.
- Critical value has change:** The new critical value for the 5th generation troponin assay will be ≥ 53 ng/L. As per previous critical value policy, only the first critical value will be called.
- Sex Specific Reference Ranges:** Male ≤15 ng/mL and Female ≤10 ng/mL
- Much more myocardial injury will be detected with Troponin 5th Generation:** Troponin 5th Generation is able to reach all the way down to a range that prior assays could not, and in doing so, there may be a measurable amount of cardiac injury that is present due to non-MI situations. Results will be reported out with the following comment: *Causes of increased troponin (excluding ACS) include sepsis, renal failure, acute respiratory failure, shock/hypotension/hypoperfusion, heart failure, pulmonary embolism, stroke, severe hypertension, malignancy as well as numerous less common diseases.*
- Transition period:** Beginning April 9th, every patient that has a Troponin ordered will have both the 4th generation and 5th generation testing performed. The purpose of this is to provide continuity of care for those patients that are being treated using the 4th generation assay. A single order will be placed by care providers. The second assay will be added by the laboratory staff through April 10, 2019.

Additional Resource File Links:

Clinical Laboratory Communication – Troponin 5th Generation Nursing 2019.04.01 (Nursing Top 5 to Know!)

Clinical Laboratory Communication – Troponin 5th Generation PL Clients 2019.04.01 (Client Top 5 to Know!)

5th Gen Troponin Algorithm

In the Loop (February-March 2019)