

High-sensitivity troponins: a major breakthrough

Carlos Eduardo S. Ferreira

Hospital Israelita Albert Einstein, São Paulo, Brazil; Hospital São Paulo/Escola Paulista de Medicina (EPM)/Universidade Federal de São Paulo (Unifesp), São Paulo, Brazil; Sociedade Brasileira de Patologia Clínica/Medicina Laboratorial (SBPC/ML), São Paulo, Brazil.

With the approval of high-sensitivity troponin assays by the Food and Drug Administration (FDA), the subject has gained new attention in the scientific community⁽¹⁾. The journal *Clinical Chemistry and Laboratory Medicine*, in its issue of October 2017, and the current volume of *Jornal Brasileiro de Patologia e Medicina Laboratorial* (JBPMML) have brought some important points to be discussed. The capacity that sensitive assays have to detect troponin in very low concentrations and of each test to work with an epitope specific to the amino acid sequence of troponin T or I brings many doubts, because there are different concentrations of circulating troponins, not only in free form but also in complexes – binary or ternary –. Measuring these different forms and the already oxidized fragments, which are constantly formed, depends on the reactivity of each assay, attached to their amount in the blood stream, besides the kidney capacity to filter these molecules. Because of the high sensitivity of the assays, the definition of values of analytical sensitivity [limit of detection (LoD)] and its intersection with the limit of the blank (LoB) were discussed by Jacob Ungerer (2017)⁽²⁾ and cause confusion for assay validation.

Another point enough discussed in the literature and with clinical relevance is the time gain in the evaluation of patients suspected of acute coronary syndrome (ACS). Nowadays, with high-sensitivity assays, emergency units can rule out the diagnosis, depending on the risk score, in up to one hour from symptom onset. This high negative predictive value (NPV) is highly cost-effective for the health system⁽³⁾.

Even with all these discussions and statements about troponins, evidence demonstrate they are gold standard for ACS diagnosis and must be ordered when there is clinical suspicion (according to a defined protocol), forgoing the use of other markers.

Their use for prognostic purposes is evident in all the articles assessing them as cardiovascular mortality markers in different conditions (sepsis, heart failure, pericarditis, endocarditis, pulmonary embolism, among others). Results are categorical when affirming that regardless the disease or the assay used, all the patients presenting increased values of troponin demonstrate higher cardiovascular mortality⁽⁴⁾.

With the approval of new assays in the North-American market, troponins have generated discussions and inspired new publications about its interpretation. Consolidating and disseminating these pieces of information are fundamental for their employment in clinical practice.

REFERENCES

1. Wu AHB, Christenson R. The era for high-sensitivity cardiac troponin has begun in the US (Finally). *J Appl Lab Med*. 2017; 2: 1-3.
2. Ungerer JJJ, Pretorius CJ. High-sensitivity cardiac troponin: do think twice, it's not all right. *Clin Chem Lab Med*. 2017; 55: 1669-71.
3. Jülicher P, Greenslade JH, Parsonage WA, Cullen L. The organisational value of diagnostic strategies using high-sensitivity troponin for patients with possible acute coronary syndromes: a trial-based cost-effectiveness analysis. *BMJ Open*. 2017; 7: e013653.
4. Ferreira CES, França CN, Fonseca FAH. Why not use a high-sensitivity troponin assay as an end point in clinical trials? *Am J Med*. 2015; 128: e29.