Current use and misuse of Troponin measurements from a large cohort: results of big data analysis


Purpose
Over the last decades, cardiac troponins (cTn) have emerged as the key biomarker for the detection of acute myocardial infarction (AMI). The recent development of high-sensitivity (hs) assays has further improved the detection of AMI as compared to conventional assays
While Tn measurement is one of the cornerstones of the management of patients who presented to the emergency department, its use is strongly discouraged in other settings.
From a big data analysis, we aimed at reporting the settings and conditions of measurement of cTn

Methods
- We examined all routine analysis data generated between February 17, 2010 and August 30, 2015 from 22 laboratories located in two districts of the Western part of France, "the French Brittany", covering 13,653km2 and corresponding to a total population of 1,723,653 people.
- These laboratories include 6 hospital/clinic laboratories and 16 non hospital/clinics laboratories; they all belong to the "Biorance Laboratoire Réunis", are equipped with Roche Diagnostics instruments.
- All data were automatically collected through the middleware after a double-step de-identification process.
- All laboratories measured the 4th generation of TnT (threshold value of 0.035ug/L) up to November 2011, then hs-cTnT (threshold value of 14ng/L).

Results
- 22,265 distinct physicians ordered at least one analysis during the study period. This corresponds to a total of 3,606,432 analysis orders for 557,650 distinct adult (>20y) patients.
- From these, 62,549 (1.7%) included at least one prescription for cTn measurement, in 34,783 distinct patients (6.2% of the study population).
- From the 34,783 distinct patients with available cTn measurements, 20,407 were males and 14,376 females (p<10^-5), 12,134 (34.9%) were >80y.

Conclusion
- If considering the january-october period each year, cTn measurements gradually increased from 4,911 in 2011 to 12,045 in 2014 (p<10^-5), mostly because of increased patients.
- From the total number of cTn measurements, 44.8% were ordered by GP and 43.7% by cardiologists; 16.6% were done in non-hospital/clinic labs, and 91.8% in urban labs (versus rural labs).
- Creatin phospho kinase (CPK) and cTn was measured simultaneously in 4,891 distinct analyses.
- A second measurement of cTn was performed in 9,978 patients (28.7%) within 7 days after the first one, mostly recommended by cardiologists (59% versus 19% for GP, p<10^-5).

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