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MULTICENTRE COMPARISON OF BNP AND NT-proBNP IMMUNOASSAYS: THE CARDIOORMOCHECK STUDY

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In order to evaluate the differences in analytical performance and clinical results of the most popular BNP and NT-proBNP immunoassays, a multicentre collaborative study, based on an external quality assessment scheme called CardioOrmo-check, have been organized and carried out in Italy since January 2005.
About 90 Italian laboratories were involved in the 2005-2007 cycles, while 112 laboratories took part in the 2008 cycle (from January to May 2008). In total, 28 samples with different BNP/NT-proBNP concentrations were prepared and measured by all partecipant laboratories for a total of 2354 determinations.
The mean total variability for BNP (50.6 CV%) was greatly higher than that for NT-proBNP (8,4 CV%). The mean variability due to the systematic difference between-methods (46.4 CV%) included the predominant part of total variability observed for BNP, resulting on average 84% of total variability, being the within-method variability on average 20.2 CV%. On the contrary, for NT-proBNP assay the within-method variability (7.3 CV%) represented the greater part of total variability (on average 75%), while the between-methods variability was smaller (4.1 CV%). Imprecision around the cut-off values showed marked differences among methods. Only the two ECLIA methods for NT-proBNP showed imprecision profiles ≤ 10 CV% around the cut-off values (i.e. about 100-150 ng/L), while Dimension method for NT-proBNP and Access and ADVIA Siemens for BNP (cut-off value about 50 ng/L) showed imprecision below 20% and the other immunoassays worse imprecison values. Moreover, BNP immunoassays are affected by large systematic differences (on average 2.7 folds between Access and ADVIA Centaur methods), while the agreement between NT-proBNP methods was better (on average 1.2 folds between Dimension and ECLIA on Elecsys platform methods).
The present study demonstrates that there are marked differences in analytical characteristics and clinical results among the most popular commercial methods for BNP and NT-proBNP assay. As a result, clinicians should give great care to compare results obtained by different laboratories, expecially when different methods are used. Furthermore, our findings confirm that it is necessary a better standardization of immunoassay methods, expecially for BNP assay.