Comparison of different methods of measurement of aspirin resistance: using the appropriate statistic

We have read with interest the recent article by Lordkipanidze et al. on the comparison of six different assays of platelet function in order to more accurately appraise the incidence and features of aspirin resistance among patients with stable coronary heart disease. Indeed, the bulk of their work rests on the use of non-parametric correlation tests between different assay types. Unfortunately, this approach has drawbacks, as already clarified by Bland and Altman in 1986.

To borrow the words of Bland and Altman: ‘in the analysis of measurement method comparison data, neither the correlation coefficient … nor techniques such as regression analysis are appropriate’. They thus suggested replacing these misleading analyses with their (at that time) novel method, indeed ‘simple both to do and to interpret’. Moreover, ‘the same method may be used to analyse the repeatability of a single measurement method or to compare measurements by two observers’.

Despite that this specific methodological article is among the 10 most quoted in the whole statistical literature (and currently associated with over 10 000 citations in the scientific literature), the Bland–Altman method is commonly overlooked. We thus recommend Lordkipanidze et al. to further strengthen their work and impact on clinical researchers by providing results of analyses based on the Bland–Altman method.

References

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Comparison of different methods of measurement of aspirin resistance: using the appropriate statistic: reply

We thank Dr Lotrionte and coworkers for their interest in our work and their suggestion to use Bland–Altman analysis of agreement to complement the results presented in our original paper. We agree with Lotrionte et al. that the Bland–Altman analysis of agreement is most useful in comparing two measurements of the same phenomenon, say a mass volume compared by ultrasonography and CT scan. However, we must point out a major difference between such an analysis and the one presented in our paper. We compared tests that do not analyse the same phenomenon, and do not report results in a directly comparable way.

In a paper published in 2003, Bland and Altman state that regression analysis in the evaluation of agreement is appropriate when two methods of measurement have different units. Indeed, Bland and Altman argue that, as one type of measurement could not be simply replaced by the other, the most suitable analysis would be to predict one result by the other through regression. Accurately predicting one result by the other would allow to conclude on adequate agreement between the methods.

However, in our study, we compared six different methodologies in their capacity to identify inadequate platelet response to aspirin, none of which can be considered an absolute gold standard. Although arachidonic-acid-induced light transmission aggregometry is considered by many as the method of reference, it yields results in units distinct from whole blood aggregometry, PFA-100®, VerifyNow Aspirin®, and urinary thromboxane metabolite levels. This precludes the use of Bland–Altman analysis of agreement. We have preferred correlation analysis over regression as we could not a priori choose which assay would yield the data to best predict the results obtained with the other assays.

Furthermore, we would like to highlight that we have used the Spearman correlation coefficient to present the degree of association between assay results, not agreement. To evaluate how closely assays agreed with arachidonic-acid-induced light transmission aggregometry in identifying aspirin resistant subjects, we used the k statistic, which specifically corrects for chance agreement in comparing classification by different methods or observers. As such, it was deemed the most appropriate for the analysis of our results.

References