Red cell distribution width is a predictor of mortality in patients undergoing coronary artery bypass surgery

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We read with interest the article ‘Red cell distribution width and coronary artery bypass surgery’, by Warwick et al., [1]. They aimed to investigate the effect of red cell distribution width (RDW)—after adjustment for the haemoglobin level—on in-hospital mortality, long-term survival, myocardial damage as assessed by creatine kinase muscle–brain (CKMB) isoenzyme release and the length of hospital and intensive care unit (ICU). They concluded that the RDW was a significant factor determining in-hospital mortality and long-term survival, but that it had no significant effect on CKMB release or length of stay in ICU or hospital. Confounding factor analysis revealed that, in the absence of anaemia, the RDW was still a significant factor determining in-hospital mortality and long-term survival. They suggested that the RDW may be a significant factor determining in-hospital mortality and long-term survival in patients undergoing isolated coronary artery bypass graft (CABG). We believe that these findings will enlighten further studies on the relationships between RDW and coronary artery bypass surgery. Thanks to the authors for their contribution.

RDW has recently been identified as an independent predictor of all-cause, long-term mortality in patients with coronary artery disease [2]. Sometimes conditions like the differential diagnosis of anaemias might affect the RDW parameter and so this parameter might be changed in any such abnormality in thyroid function tests, renal or hepatic dysfunction (creatinine >1.5 mg/dl, aspartate aminotransferase and alanine transaminase more than twice the upper limit of normal, respectively), inflammatory diseases and any medication. On the other hand, it is also reported that an increased RDW may be associated with ethnicity and nutritional deficiency (i.e. iron, vitamin B12 and folic acid). Reduced glomerular filtration rate (GFR) may also be associated with adverse outcomes in patients with cardiovascular disease. In a previous study, pre-operative GFR was predictive of all-cause mortality, cardiovascular mortality and combined cardiovascular mortality and morbidity. GFR may be useful in identifying those patients undergoing CABG with subclinical chronic kidney disease [3]. For this reason, it would be better if the authors mentioned any of these possible conditions.

Present studies have shown that elevated levels of inflammatory molecules are markers of atherosclerotic disease activity. These molecules also indicate an increased risk of the progression of CABG and they can be reduced by medications such as antihypertensive therapy and acetylsalicylic acid treatment [4, 5]. Additionally, not only RDW but also neutrophil lymphocyte ratio, gamma-glutamyltransferase, C-reactive protein, mean platelet volume and uric acid are markers easily used to assess the cardiovascular disease of the patients [6]. These markers might be useful in clinical practice. RDW itself, alone without other inflammatory markers, may not give information to clinicians about the inflammatory condition and prognostic indication of the patients. So we think that it should be evaluated together with other serum inflammatory markers. Finally, it would be better if the authors defined their timescale for measuring RDW levels, because delay in blood sampling can cause abnormal results in RDW measurements.

REFERENCES

We appreciate the comments of Balta et al. [1].

With regard to the differential diagnosis such as anaemia, thyroid function tests, renal or hepatic dysfunction, all patients were assessed clinically by the anaesthesiologist for thyroid disease, as this is a specific anaesthetic risk factor for cardiac surgery. Patients on thyroid medication, and/or a history of thyroid disease, had their thyroid status normalized prior to surgery, as assessed via thyroid function tests. With regard to renal dysfunction, dialysis was a covariate in the multivariate analyses, Table 3 in [2]. We agree that glomerular filtration rate would have been a more accurate variable to analyse, but this was not available. The association between hepatic dysfunction and Red cell distribution width (RDW) is debated [3].

With regard to nutritional deficiency (i.e. iron, vitamin B12 and folic acid) and ethnicity, our population is 99% Caucasian, and the coronary artery bypass grafts (CABG) population in the western world is seldom malnourished, as was mentioned in our paper, having a mean body mass index of 28.4 kg/m².

Elevated levels of inflammatory molecules and poor outcomes are well described in a number of areas of cardiovascular disease; however, the interaction with RDW remains speculative as no studies exist. Aspirin is only associated with changes in RDW if anaemia exists [4], a condition that we adjusted for. We are unaware of any evidence that cardiovascular medications affect RDW.

All our RDW samples were analysed within 1–6 h of collection; however, this was not recorded. We were unable to find any publications dealing with delays as a cause of error in RDW measurement.

We thank Balta et al. for their insightful comments.

REFERENCES