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ORIGINAL ARTICLE

Red cell distribution width: A marker of in-hospital mortality in ST-segment elevation myocardial infarction patients?

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KEYWORDS
Red cell distribution width;
Biological marker;
In-hospital mortality;
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Abstract
Background: Red cell distribution width (RDW) is the percentage of the erythrocyte volume variation and has been identified as a biological marker in patients with cardiovascular disease. Increased levels have been associated to worse clinical outcomes and it is suggested that it could be useful as a prognostic risk factor in this group of patients.
Methods: This was an observational, prospective, longitudinal and analytic study with the objective of determining the correlation between RDW and in-hospital mortality in ST elevation myocardial infarction (STEMI) patients. 61 patients were included. We analyzed the correlation between RDW and in-hospital mortality as well as that between RDW and the GRACE risk score at hospital admission. Pearson correlation was determined in both cases by using IBM SPSS statistics software.
Results: 61 STEMI patients were included, 77% (47) male and 14% (14) female. Average age was 61.8 ± 11.7 years. Average GRACE risk score was 154.9 ± 40.3. Average RDW was 14.3 ± 1.07. In-hospital mortality presented in 5 (8.1%) cases. It was found, as expected, a positive correlation between in-hospital mortality and the GRACE risk score ($r = 0.314$, $P = 0.05$). Regarding the primary end-point of the study, it was found a positive correlation between RDW and in-hospital mortality ($r = 0.343$), however there was no statistical significance. Regarding the secondary end-point we observed a positive statistically significant correlation between RDW and the GRACE risk score at hospital admission ($r = 0.410$, $P = 0.01$).

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Conclusions: RDW is a biological marker of easy acquisition that does not generate additional cost to neither the patient nor the health institutions. High RDW levels could be useful to predict in-hospital mortality in STEMI patients, as well as to give additional value to established risk scores such as the GRACE.

PALABRAS CLAVE
Ancho de distribución eritrocitaria;
Biomarcador;
Mortalidad intrahospitalaria;
IAMCEST

Ancho de distribución eritrocitaria: ¿marcador de muerte intrahospitalaria en pacientes con infarto al miocardio con elevación del segmento ST?

Resumen
Antecedentes: El ancho de distribución eritrocitaria (ADE) es el porcentaje de variación del volumen de los eritrocitos y ha sido identificado como un biomarcador en pacientes con enfermedad cardiovascular. Niveles elevados han sido asociados a peores resultados clínicos y se sugiere que podría ser útil como marcador pronóstico de riesgo en este grupo de pacientes.
Métodos: Se realizó un estudio observacional, prospectivo, longitudinal y analítico con el objetivo de determinar la correlación entre el ADE y la mortalidad intrahospitalaria en pacientes con infarto al miocardio con elevación del segmento ST (IAMCEST). 61 pacientes fueron incluidos. Analizamos la correlación entre el ADE y la mortalidad intrahospitalaria así como aquella entre el ADE y la escala de riesgo GRACE al ingreso hospitalario. Se determinó la correlación de Pearson en ambos casos utilizando el programa SPSS statistics de IBM.
Resultados: Se incluyeron 61 pacientes con IAMCEST, 77% (47) hombres y 14% (14) mujeres. La edad promedio fue de 61.8±11.7 años. La puntuación promedio en la escala de GRACE fue 154.9±40.3. El ADE promedio fue de 14.3±1.07. La mortalidad intrahospitalaria se presentó en 5 (8.1%) casos. Se encontró, como era esperado, una correlación positiva entre la mortalidad intrahospitalaria y la puntuación en la escala de GRACE ($r = 0.314$, $P = 0.05$). Respecto al objetivo primario, se identificó una correlación positiva entre el ADE y la mortalidad intrahospitalaria ($r = 0.343$), sin embargo, no fue estadísticamente significativa. Respecto al objetivo secundario, se identificó una correlación positiva y estadísticamente significativa entre el ADE y la puntuación en la escala de GRACE al ingreso hospitalario ($r = 0.410$, $P = 0.01$).
Conclusiones: El ADE es un marcador biológico de fácil adquisición, el cual no genera costos adicionales para el paciente ni para los servicios de salud. Niveles incrementados del ADE podrían ser de utilidad para predecir la mortalidad intrahospitalaria en pacientes con IAMCEST, así como aportar valor adicional a las escalas de riesgo establecidas, tales como la de GRACE.

Introduction

Although the classical risk factors for cardiovascular disease (CVD) are very important, identification of potential novel risk factors could help clarify CVD pathophysiology, offers novel targets for intervention, and lead to improved risk stratification. Erythrocytes, or red blood cells (RBCs), are constituents of clots and thrombi formed in vivo, but little is known about whether inherent properties of RBCs could affect the risk for CVD.[1]

Classical in vitro studies of the function of the coagulation system are performed in plasma, without erythrocytes. However, RBCs are constituents of clots and thrombi formed in vivo and may play a prothrombotic role in blood coagulation by increasing blood viscosity and forcing platelets toward the vessel wall.[1]

Red blood cell distribution width (RDW) measures RBCs volume variations (anisocytosis) and is reported as part of a standard complete blood count.[1–13] It is defined as the quotient of standard deviation of RBC volume and its mean volume and is expressed as a percentage according to the following formula: RDW = (standard deviation of red blood cell volume/mean cell volume) × 100. (The result is multiplied by 100 in order to express it as a percentage.) Higher RDW values reflect greater variations in RBC volume.[1–3] Although RDW is usually measured as a routine test, its levels have been mainly used in the differential diagnosis of several kinds of anemia and high levels indicate the presence of anisocytosis.[1,4–9]

Increased RDW has been associated with different CVDs such as coronary heart disease, stroke, heart failure, atrial fibrillation, peripheral artery disease, pulmonary arterial hypertension, and venous thromboembolism. RDW has also

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