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CLINICAL RESEARCH

Red cell distribution width predicts mortality in infective endocarditis

Le biomarqueur de distribution érythrocytaire prédicteur de la mortalité dans l'endocardite infectieuse

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KEYWORDS
Infective endocarditis;
Outcome;
Red cell distribution width

Summary
Background. — Infective endocarditis (IE) is associated with significant morbidity and mortality. Red cell distribution width (RDW) is a recently recognized biomarker of adverse outcome in a number of acute and chronic conditions.
Aim. — To investigate the relationship between RDW and 1-year survival in patients with IE.
Methods. — Clinical records from two tertiary centres were used to analyze data from patients with definite IE. Clinical, echocardiographic and biochemical variables were evaluated along with RDW. One-year survival status after index hospitalization was identified for each patient.
Results. — One hundred consecutive patients (mean age 47.8 ± 16.7 years; 61% men) with definite IE were enrolled. According to receiver operating characteristic curve analysis, the optimal RDW cut-off value for predicting mortality was 15.3% (area under the curve 0.70; $P = 0.001$). Forty-one patients (41%) died within 1 year; of these, 88% had RDW results > 15.3%. Univariate Cox proportional-hazards analysis showed that RDW > 15.3%, heart failure, renal failure, cardiac abscess, severe valvular regurgitation and presence of dehiscence were associated with increased mortality. Multivariable Cox proportional-hazards analysis revealed that renal failure (hazard ratio [HR] 3.21, 95% confidence interval [CI] 1.35—7.59; $P = 0.008$), heart failure (HR 2.77, 95% CI 1.1—6.97; $P = 0.03$) and RDW > 15.3% (HR 3.07, 95% CI 1.06—8.86; $P = 0.03$) were independent predictors of mortality in patients with IE.

Abbreviations: IE, infective endocarditis; RDW, red cell distribution width; ROC, receiver operating characteristic.

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Conclusion. — According to our results, mortality is high in patients with IE. RDW is a promising biomarker for predicting 1-year survival rates in these patients.

MOTS CLÉS
Endocardite infectieuse ;
Suivi ;
Distribution érythrocytaire

Résumé
Justification. — L'endocardite infectieuse est associée à une augmentation de la morbi-mortalité significative. La distribution érythrocytaire est un biomarqueur de description récente prédisant les complications dans différentes situations aiguës et chroniques.
Objectif. — Évaluer la relation entre ce biomarqueur et la survie à un an chez des patients hospitalisés pour endocardite infectieuse.
Méthode. — Les dossiers cliniques de deux centres tertiaires ont été utilisés pour analyser les informations à partir des dossiers de patients ayant une endocardite infectieuse certaine. Les données cliniques, échocardiographiques et biochimiques ont été évaluées parallèlement à l'évaluation de ce biomarqueur. La survie à un an après l'hospitalisation initiale a été identifiée pour chaque patient.
Résultats. — Cent patients consécutifs (âge moyen 47,8 ± 16,7 ans ; 61 % d'hommes) ayant une endocardite infectieuse certaine ont été inclus. En utilisant l'analyse basée sur les surfaces sous la courbe ROC, la valeur seuil optimale pour ce biomarqueur prédisant la mortalité était de 15,3 % (surface sous la 0,70 ; $p = 0{,}001$). Quarante et un patients (41 %) sont décédés dans l'année. Parmi eux 88 % avaient un taux de biomarqueur > 15,3 %. L'analyse univariée selon le modèle proportionnel de Cox a montré qu'une valeur > 15,3, la présence d'une insuffisance cardiaque, d'une insuffisance rénale, d'un abcès cardiaque, une régurgitation valvulaire significative et la présence d'une déhiscence valvulaire étaient associées à une surmortalité. L'analyse multivariée selon le modèle de Cox a indiqué que l'insuffisance rénale (*hazard ratio* [HR] 3,21, IC 95 % 1,35—7,59 ; $p = 0{,}008$), l'insuffisance cardiaque (HR 2,77, IC 95 % 1,1—6,97 ; $p = 0{,}03$) et le biomarqueur de distribution érythrocytaire > 15,3 % (HR 3,07 ; IC 95 % 1,06—8,86 ; $p = 0{,}03$).
Conclusion. — Nos résultats suggèrent qu'il existe une surmortalité chez les patients ayant une endocardite infectieuse. Ce biomarqueur paraît intéressant pour prédire la survie à un an chez les patients hospitalisés pour endocardite infectieuse confirmée.

Background

Infective endocarditis (IE) is an endovascular infection of the heart that usually affects valvular structures and, with increasing frequency, implants within the heart, such as prosthetic valves or pacemaker electrodes. There have been significant improvements in the treatment of most cardiovascular diseases in recent decades; however, prognosis still remains poor in IE. The current in-hospital mortality rate is around 20%, while long-term mortality can be as high as 40% [1—3].

Identifying patients at increased risk of adverse outcomes is challenging due to the broad spectrum of the cardiac pathology and infecting organisms. Right-sided native-valve IE usually has a benign course, with even a short-term antibiotic regimen being sufficient, while prosthetic IE or device-related IE can be more severe, requiring different management strategies [4]. The causative organism can differ depending on the history of surgery, drug abuse, healthcare contact, invasive procedures, immunosuppression and even geographical differences [3]. Although some clinical predictors have been identified to estimate poor outcome, the course of the disease can still differ in each individual [5]. A biomarker that predicts outcome would be helpful in clinical practice to identify high-risk patients that need more aggressive treatment.

Red cell distribution width (RDW) —a measure of red blood cell size heterogeneity— has been used traditionally in the differential diagnosis of anaemia, as it can increase in cases of haemolysis, blood transfusion or ineffective erythropoiesis. Recent studies have shown that elevated RDW is associated with adverse outcome in various clinical settings, including thromboembolic events, cardiovascular diseases and respiratory diseases [6—9]. The prognostic implications of RDW in IE have not been studied. In the present study, we aimed to investigate the relationship between RDW and 1-year survival in patients with IE.

Methods

Study patients

Between January 2008 and January 2011, patients diagnosed with definite IE (according to the modified Duke criteria) at Cumhuriyet University Faculty of Medicine and Yuksek Ihtisas Education and Research Hospitals were enrolled in this study [10]. Patients with chronic liver disease and those with a