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ORIGINAL ARTICLE

Neutrophil-to-lymphocyte ratio predicts coronary artery lesion complexity and mortality after non-ST-segment elevation acute coronary syndrome

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Abstract

Objective: Inflammatory mechanisms are known to play an important role in coronary artery disease. The present study aimed to investigate the importance of the neutrophil-to-lymphocyte ratio (NLR) in terms of in-hospital mortality and its association with currently used risk scores in patients with non-ST-elevation acute coronary syndrome (NSTE-ACS).

Methods: Three hundred and seventeen patients with NSTE-ACS were included. The patients were divided into tertiles according to their NLR values (NLR <2.6, NLR=2.6–4.5, and NLR >4.5). Clinical and angiographic risk was evaluated by the SYNTAX and GRACE risk scores.

Results: The GRACE risk score was significantly higher in the group with high NLR values compared to those with moderate or low NLR (161.5±40.3, 130.5±32.3, and 123.9±34.3, respectively, p<0.001). Similarly, the SYNTAX score was significantly higher in the group with high NLR values (20.4±10.1, 15.5±10.5, and 13.4±7.8, respectively, p=0.003). Moreover, both GRACE (r=0.457, p<0.001) and SYNTAX scores (r=0.253, p=0.001) showed a significant positive correlation with NLR.

Conclusion: NLR has been found to be correlated with clinical and angiographic risk scores. Low NLR might be a good predictor for low in-hospital mortality and simple coronary anatomy in NSTE-ACS patients.

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Rácio neutrófilo-linfócito prevê a complexidade da lesão arterial coronária e a mortalidade após o enfarte do miocárdio sem elevação do segmento ST

Resumo

Objetivos: Sabe-se que os mecanismos inflamatórios têm um papel importante na doença arterial coronária. O presente estudo visa investigar a importância do rácio neutrófilo/linfócito (RNL) relativamente à mortalidade hospitalar e à sua associação com os *scores* de risco atuais em doentes com síndromes coronárias agudas sem elevação do segmento-ST (SCA-NSTE).

Métodos: Foram incluídos 317 doentes com SCA-NSTE. Os doentes foram divididos em tercis de acordo com os seus valores de RNL (RNL < 2,6, RNL = 2,6-4,5 e RNL > 4,5). Os *scores* de risco clínicos e angiográficos foram avaliados pelos métodos de risco SYNTAX e GRACE.

Resultados: O *score* de risco GRACE foi significativamente mais elevado no grupo com valores RNL elevados comparado com os grupos com RNL moderado ou baixo (161,5 ± 40,3, 130,5 ± 32,3 e 123,9 ± 34,3, respetivamente, p<0,001). Do mesmo modo, o *score* SYNTAX foi significativamente superior no grupo com valores RNL elevados (20,4 ± 10,1, 15,5 ± 10,5 e 13,4 ± 7,8, respetivamente, p=0,003). Por outro lado, tanto o *score* de risco GRACE (r=0,457, p<0,001) como o *score* SYNTAX (r=0,253, p=0,001) mostraram uma correlação positiva significativa com RNL.

Conclusão: Verificou-se que o RNL está correlacionado com os *scores* de risco clínicos e angiográficos. Um RNL baixo pode ser um bom fator preditor de mortalidade intra-hospitalar e de anatomia coronária simples em doentes com enfarte do miocárdio sem elevação do segmento ST.

Introduction

The content and intensity of treatment, and the need for intervention, are closely linked to disease severity in the treatment of patients with coronary artery disease (CAD). Clinical and angiographic risk scores have been developed to aid decision-making. Current guidelines recommend the GRACE and SYNTAX risk scoring systems for patients diagnosed with non-ST-elevation acute coronary syndrome (NSTE-ACS).[1,2] The GRACE risk score includes parameters such as ECG changes, initial cardiac markers, and serum creatinine, in addition to clinical characteristics such as age, heart rate, systolic blood pressure, and degree of heart failure.[3] The SYNTAX risk score grades the severity and complexity of lesions on coronary angiography.[2] It also has an important role in decisions as to whether to perform percutaneous coronary intervention.

Several studies have shown the role of inflammation in the pathophysiology of atherosclerosis,[4,5] and inflammatory mediators such as C-reactive protein (CRP) can be used for risk stratification in CAD.[4] The neutrophil-to-lymphocyte ratio (NLR) is a new marker recently shown to be effective in CAD and certain non-cardiac diseases. Previous studies have demonstrated that NLR is associated with adverse events in stable coronary disease,[6] long-term mortality in patients with ST-segment elevation myocardial infarction (STEMI),[7] and in-hospital and six-month mortality in acute coronary syndrome.[8] NLR has also been shown to be a predictor of poor prognosis in patients with NSTE-ACS.[9] However, the association between NLR and clinical risk scores, and whether it is a determinant of lesion complexity, particularly in CAD, have not been investigated. In the present study, we aimed to investigate the importance of NLR in terms of hospital mortality, and its association with currently used risk scores in patients with NSTE-ACS.

Methods

Study population

In this study, patients admitted to the cardiology clinic at Ondokuz Mayis University with NSTE-ACS between January 2006 and January 2012 were retrospectively assessed. The inclusion criterion was the NSTE-ACS diagnosis code in the electronic patient database. The medical history of all patients with the NSTE-ACS diagnosis code was obtained and assessed by the investigators. Exclusion criteria included inconclusive NSTE-ACS diagnosis according to medical records, hematological disease, autoimmune disease, infectious or inflammatory disease, severe renal disease (glomerular filtration rate <30 ml/min/1.73 m^2), severe liver disease, and ongoing treatment with immunosuppressive agents.

Definition of non-ST-elevation acute coronary syndrome

NSTE-ACS was defined as the presence of T-wave inversion or ST-segment depression and/or positive troponin I in the absence of electrocardiographic (ECG) ST elevation in patients presenting with angina or equivalent. Positive troponin was defined as troponin I >0.1 ng/ml.