

Prognostic stratification in pulmonary hypertension: A multi-biomarker approach

Revista Portuguesa de Cardiologia (English Edition), Volume 36, Issue 2, February 2017, Pages 111-125

Authors

Rui Plácido, Nuno Cortez-Dias, Susana Robalo Martins, Ana G. Almeida, Carina Calisto, Susana Gonçalves, Malha Sadoune, António Nunes Diogo, Alexandre Mebazaa, Fausto J. Pinto

Abstract

Introduction

Pulmonary hypertension (PH) covers a group of conditions characterized by an increase in pulmonary vascular resistance leading to right ventricular failure. Risk stratification is crucial for adequate prognostic and therapeutic assessment. However, the accuracy of conventional parameters is limited, especially biomarkers.

Objectives

To determine the prognostic value of new biomarkers and their combination in a multi-biomarker approach to predict outcome in patients with PH.

Methods

In this prospective cohort study, PH patients underwent clinical, echocardiographic and laboratory assessment, including quantification of serum N-terminal pro-brain natriuretic peptide (NT-proBNP) and of the following new biomarkers: mid-regional pro-adrenomedullin (MR-proADM), copeptin, endothelin-1, mid-regional pro-atrial natriuretic peptide (MR-proANP) and soluble ST2 (sST2), the interleukin-33 receptor. The accuracy of the different parameters for predicting all-cause mortality and death or hospitalization of cardiac causes was determined. The prognostic value of a multi-biomarker score based on the tertile distribution of serum NT-proBNP, MR-proANP, renin and sST2 was compared to conventional markers.

Results

Forty-three patients (72.1% female, age 59±15 years) were included, most of whom (65.1%) had group 1 PH. During a median follow-up of 34 months, 26% of the patients died and 35% were hospitalized for cardiac causes. Atrial and ventricular dimensions and right ventricular fractional area change were prognostic predictors. Log NT-proBNP (HR: 31.14; 95% CI: 3.12-310.7; p=0.003) and renin (HR: 1.02; 95% CI: 1.005-1.038; p=0.009) were independent predictors of mortality. MR-proANP (HR: 1.008; 95% CI 1.004-1.011; p<0.001) and sST2 (HR: 1.005; 95% CI 1.001-1.009; p=0.04) were predictors of death or hospitalization. The prognostic value of the multi-biomarker score was higher than any of the conventional parameters, and enabled identification of risk groups (the high-risk group had three-year mortality of 77.8%).

Conclusion

A multi-biomarker approach was superior for risk stratification to any single marker. A score that incorporates NT-proBNP, MR-proANP, renin and sST2 accurately identifies patients at low, intermediate and high risk.

Keywords:

Pulmonary hypertension; Biomarkers; Prognosis; Echocardiography