Journal of Cardiovascular Magnetic Resonance

Poster presentation

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N-terminal fragment of proBNP is a marker of high cardiac output cardiomyopathy evaluated by CMR in thalassemia syndromes

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from 13th Annual SCMR Scientific Sessions
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

Journal of Cardiovascular Magnetic Resonance 2010, **12**(Suppl 1):P266 doi:10.1186/1532-429X-12-S1-P266

This abstract is available from: http://jcmr-online.com/content/12/S1/P266

Introduction

In thalassemia patients heart failure remains the main cause of mortality. High cardiac output state due to chronic anaemia is a significant determinant of cardiomyopathy, in particular in thalassemia intermedia (TI) patients (a moderate form, not transfusion dependent). Hypoxia and volume overload are known stimuli for plasma N-terminal fragment of proBNP (NT-proBNP) raise. Nevertheless, NT-proBNP role in clinical management of thalassemia patients has not been fully investigated.

Purpose

Aim of our study was to assess the role of NT-proBNP assay in a large prospective cohort of thalassemia patients, evaluated by cardiovascular magnetic resonance (CMR).

Methods

215 thalassemia patients (39 TI, age 38 ± 12 years, 51% females) and 176 thalassemia major patients (TM, age 30 ± 9 years, 54% females) underwent consecutively CMR (1.5 T) and blood sampling for plasma assay of NT-proBNP. Myocardial iron overload was assessed using a multislice multiecho T2* approach able to provide the global T2* value in the left ventricle. Cine sequences were obtained to quantify biventricular morphological and functional parameters. RV and LV volumes and ejection fraction (EF) were evaluated by a semi-automatic software (Mass Plus, Leiden, NL).

Results

NT-proBNP levels were comparable in TI and TM patients (139 ± 146 ng/L versus 108 ± 122 ng/L; P = NS). Mean haemoglobin levels ($P < 0.0001$) and myocardial iron overload ($P = 0.001$) were significantly lower in TI than in TM patients. Left end-diastolic volume ($P < 0.0001$) and mass indexes ($P = 0.002$), right ejection fraction ($P < 0.0001$) and biatrial area indexes ($P = 0.006$) were significantly higher in TI vs. TM patients. In TI patients NT-proBNP was negatively associated with mean haemoglobin levels ($r = -0.6$, $P = 0.008$) and positively with left and right atrial area indexes ($r = 0.6$, $P = 0.001$ and $r = 0.4$, $P = 0.007$, respectively), left and right end diastolic volume indexes ($r = 0.5$, $P = 0.003$ and $r = 0.3$, $P = 0.04$, respectively) and left ventricular mass index ($r = 0.4$, $P = 0.007$). In TM patients no significant correlation was found between NT-proBNP levels and morphological biventricular parameters. In both groups no significant correlation was found between NT-proBNP levels and myocardial iron overload.

Conclusion

Hypoxia and volume overload due to chronic anaemia, more pronounced in TI patients, justify the correlation

between NT-proBNP and high cardiac output-related findings in TI patients. These data suggest a) a potential routinary use of NT-proBNP as marker of high cardiac output cardiomyopathy in the anaemic thalassemia population; b) to reconsider the current haematological/transfusional management in TI patients.