Letter to the Editor

Role of B-type natriuretic peptide and echocardiographic indices in predicting the development of acute heart failure following beta-blocker uptitration in chronic heart failure patients with left ventricular systolic dysfunction

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Abstract

We evaluated the role of clinical, BNP and echocardiographic left ventricular (LV) indices in predicting the development of acute heart failure (HF) following beta-blocker initiation and uptitration in 50 stable CHF patients with LVEF < 40% and creatininemia < 250 μmol/l. Use of NYHA class alone predicted the development of acute HF decompensation in only 56% and the absence of this event in 93% of patients. Use of echocardiographic indices (systolic PAP < 40 mmHg or E/A ratio < 1.4 or EDT > 145 ms) predicted the absence of acute HF decompensation in 100% of patients. Use of NYHA > 3 combined with BNP > 398 pg/ml or with echocardiographic indices (i.e. systolic PAP > 40 mmHg or E/A > 1.4 or EDT < 145 ms) predicted the development of acute HF decompensation in 100% of patients.

In conclusion use of BNP and echocardiographic LV filling pressure indices in combination with NYHA class may predict beta-blocker tolerance more accurately than clinical indices alone in patients with LV systolic dysfunction (LVEF < 40%).

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Though beta-blockers are strongly recommended as standard therapy for all patients with CHF and systolic dysfunction [1,2], the unpredictable occurrence of acute heart failure (HF) decompensation following beta-blocker initiation and uptitration may limit its large use in clinical practice.

Thus, we explored the role of clinical, BNP and echocardiographic indices (E/A ratio, E/Ea ratio, E Deceleration Time (EDT), systolic Pulmonary Artery Pressure (PAP)) in predicting the development of acute HF following beta-blocker initiation and uptitration in 50 stable CHF patients with LVEF < 40% and creatininemia < 250 μmol/l. Bisoprolol was initiated in 46% of patients and uptitrated in 54% of them (mean daily dose: 2.3 ± 0.2 mg) as recommended by ESC/ACC/AHA Guidelines [1,2]. Acute HF was defined as pulmonary edema. This complication occurred in 16% of patients despite close clinical follow up throughout the 3 weeks hospitalisation. Among these decompensated patients, 62% of them were initiated beta-blockers while 38% of them were uptitrated beta-blockers. On univariate analysis, baseline clinical (age, NYHA class, blood pressure), echocardiographic indices (systolic PAP, E/A ratio, EDT, E/Ea ratio) and BNP concentrations predicted the development of acute HF decompensation after beta-blockade initiation and uptitration. Indeed, patients with supramedian NYHA class, BNP concentrations, systolic PAP levels, E/A ratio or with inframedian EDT values at admission were at increased risk of acute HF decompensation following beta-blocker initiation and uptitration. Use of NYHA class alone predicted the development of acute HF decompen-
sation in only 56% and the absence of this event in 93% of patients. Use of echocardiographic indices (systolic PAP < 40 mmHg or E/A ratio < 1.4 or EDT > 145 ms) predicted the absence of acute HF decompensation in 100% of patients. Use of NYHA > 3 combined with BNP > 398 pg/ml or with echocardiographic indices (i.e. systolic PAP > 40 mmHg or E/A > 1.4 or EDT < 145 ms) predicted the development of acute HF decompensation in 100% of patients throughout the 3 weeks hospitalisation. As Logeart et al. [3] we reported in the present work that high baseline BNP levels were more relevant than changes in BNP levels during hospitalisation for predicting the development of acute HF decompensation.

Thus, use of BNP and echocardiography may greatly help physicians in initiating and uptitrating beta-blockers in CHF patients with LV systolic dysfunction (LVEF < 40%) by identifying patients at low and at high risk of developing acute HF decompensation. The increase in diuretics doses allowed us to maintain beta-blockers in half of decompensated patients, suggesting that an early increase in diuretics in patients at high risk of acute HF decompensation (as defined above) may probably prevent this complication.

1. Study limitations

This is a pilot study with a small size of the cohort, suggesting that these results need to be confirmed by larger studies.

2. Conclusions

Use of BNP and echocardiographic LV filling pressure indices in combination with NYHA class may predict beta-blockers tolerance more accurately than clinical indices alone in patients with LV systolic dysfunction (LVEF < 40%).

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