

Persistent NT-proBNP elevation in acute pulmonary embolism predicts early death

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Received 22 March 2007; received in revised form 9 April 2007; accepted 9 April 2007

Available online 24 April 2007

Abstract

Aims: Low levels of brain natriuretic peptides on admission identify low-risk patients with acute pulmonary embolism (APE) through their high NPV for mortality. However, increased natriuretic peptide values on admission are less helpful for identifying high-risk patients due to their low PPV. The aim of the study was to test whether the PPV for mortality can be improved by performing serial NT-proBNP measurements on admission, at 12 h, and at 24 h.

Methods and results: We prospectively included 113 consecutive patients with APE (mean age 63 ± 18 years), of whom 10 had clinically massive APE. Thirty-day mortality was 15% (95% CI: 8%–22%). In survivors, median NT-proBNP levels decreased within 24 h from 1895 ng/L (range: 16–33,340) to 1007 ng/L (range: 9–33,243) ($p < 0.001$). In non-survivors, median NT-proBNP levels at baseline (11,491 ng/L, range: 618–60,958) remained elevated at 24 h (8139 ng/L, range: 35–70,018; $p = \text{NS}$). The 30-day mortality rate in the group of 18 patients with NT-proBNP > 7500 ng/L and less than 50% decrease of NT-proBNP within 24 h was 61% (95% CI: 39%–84%). PPV and NPV of NT-proBNP > 7500 ng/L on admission and less than 50% decrease of NT-proBNP within 24 h were 61% and 94%, respectively.

Conclusion: Persistent elevation of plasma NT-proBNP levels within 24 h after APE diagnosis indicates ongoing right ventricular dysfunction with a poor prognosis. These critically ill patients may be candidates for rapid aggressive intervention, including thrombolysis, catheter thrombectomy, or surgical embolectomy.

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Keywords: Pulmonary embolism; Natriuretic peptides; Prognosis; Mortality

1. Introduction

Serial measurements of brain natriuretic peptides were found to provide important prognostic information in patients with acute heart failure [1,2] and may be used for monitoring ventricular remodelling after myocardial infarction [3]. There is a growing evidence on prognostic value of BNP in patients with acute pulmonary embolism (APE) [4–6]. Low levels of brain natriuretic peptides on admission are helpful for identifying low-risk patients through their high negative predictive value (NPV) for mortality [7–9]. However, increased natriuretic peptide values on admission are less helpful for identifying

high-risk patients due to their low positive predictive value (PPV). The aim of the study was to test whether the PPV for mortality can be improved by performing serial NT-proBNP measurements on admission, at 12 h, and at 24 h.

2. Materials and methods

2.1. Patients and management of pulmonary embolism

The study population comprised consecutive patients admitted to our department with APE, confirmed by contrast-enhanced spiral computed tomography, or by high-probability lung scintigraphy. Acute PE was diagnosed when symptoms of PE before the diagnosis lasted no longer than 7 days. On admission clinical data were collected and echocardiography was performed.

The endpoint of the study was defined as all-cause death. All events were recorded up to 30 days after the diagnosis of APE. Massive, submassive and nonmassive APE groups were defined according to European Society of

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