

Blood pressure variability estimated by average real variability predicts stroke in progression of acute ischemic stroke.

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Abstract

Background: The relationship between blood pressure variability and stroke in progression (SIP) in acute ischemic stroke (AIS) or transient ischemic attack (TIA) is still controversial. The aim of this study was to evaluate the impact of blood pressure variability estimated by average real variability on SIP.

Method: We prospectively enrolled 251 consecutive patients with AIS or TIA (within 7 days after onset). Blood pressure was measured at 2 h intervals throughout the first 24 h, then every 4 h up to the 7th day. Average real variability was used to represent blood pressure variability. Ischemic stroke (IS) patients with an increase of national institutes of health stroke scale ≥ 3 scores or TIA patients in the event of stroke within 7 days after admission were defined as stroke. Patients were grouped in low and high blood pressure average real variability groups.

Results: The incidence rate of SIP was 8.3%. In univariate analysis, high D2-7 systolic blood pressure average real variability, female, and high total cholesterol level were significantly associated with SIP. In multivariate logistic regression analysis, SIP was independently predicted by total cholesterol and high D2-7 systolic blood pressure average real variability.

Conclusion: High D2-7 systolic blood pressure average real variability was an independent predictor of SIP in AIS or TIA patients.

Keywords: Stroke in progression, Ischemic stroke, Transient ischemic attack, Blood pressure variability, Average real variability.

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Introduction

Neurological deterioration that occurs within the first few hours or days after stroke onset has been defined as stroke in progression (SIP). It is reported that 4.5% -37% of patients with acute stroke develop SIP [1-5] increased the risk of morbidity and mortality. Many researchers have investigated the causes of neurological deterioration in acute stroke patients, but the causes of neurological deterioration are still not fully defined. It's commonly observed that the blood pressure value on admission in patients admitted for ischemic stroke (IS) or transient ischemic attack (TIA) is highest and falls spontaneously in the subsequent hours or days [6-11].

Blood pressure variability (BPV)-the variation of blood pressure continuously with time is presumed to be a strong and independent predictor of stroke in general [12-14], potentially more powerful than the absolute blood pressure levels [15]. However, previous studies mostly shed light on the association between outcome and long-term BPV [16-18], but the predictive value of short-term BPV remains unclear, particularly BPV during the acute phase of IS [19]. In addition, previous studies mostly were designed to observe the prognosis

of BPV for hypertensive patients, previous stroke or TIA patients [16-18], not for acute ischemic stroke (AIS) or TIA patients. Furthermore, various indexes, such as standard deviation (SD), coefficient of variation (CV), variation independent of mean (VIM), weighted standard deviation (wSD), and average real variability (ARV), have been used to evaluate BPV in different researches, but uncertainty remains about which index to assess properly the value of BPV as a risk factor. The aim of this prospective study was to assess the predictive value of BPV estimated by ARV on SIP in AIS or TIA.

Materials and Methods

Participants and study setting

This was a prospective cohort study based on the clinical data of 251 patients admitted consecutively for IS or TIA within 7 days after onset to the Neurological Department, the First Affiliated Hospital, Jinan University Guangzhou, from August 2012 to August 2013. Cerebral computerized tomography (CT), or magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) were performed and described