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AMBULATORY BLOOD PRESSURE MONITORING INDEXES IN ESSENTIAL HYPERTENSIVE PATIENTS WITH ISCHAEMIC STROKE

Abstract. *The aim of the study is to determine ABPM indexes in essential hypertensive patients with ischaemic hemisphere stroke in compare with those in essential hypertensive patients. We investigated 118 patients (62 (56;72) years, 33 % male) with essential hypertension (EH): the first group of patients (n=35) were EH with an acute phase of ischemic stroke (IS) and the second one (n=83) – EH without acute stroke. It was found significant difference between the first and the second group of the AASI for 24 h (0.57 (0.40;0.67) vs. 0.46 (0.35;0.59), respectively; P=0.031)), the AASI for night period of time (0.63 (0.31;0.86) vs. 0.44 (0.26;0.60), respectively; P=0.013), however, there were no statistician difference in the Sym_AASI and the Sym_Slope. In conclusion, this study shows that only the AASI is high in essential hypertensive individuals with acute phase of ischemic stroke in comparison to the same parameters of essential hypertensive patients without acute stroke, meanwhile, there is no statistician difference in the Sym_AASI and the Sym_Slope.*

Keywords: *essential hypertension, ischemic stroke, ambulatory blood pressure monitoring, ambulatory arterial stiffness index, symmetric slope, symmetric ambulatory arterial stiffness index*

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ИНДЕКСЫ ЖЕСТКОСТИ АРТЕРИАЛЬНОЙ СТЕНКИ, РАСЧИТАННЫЕ ПРИ ПОМОЩИ АМБУЛАТОРНОГО МОНИТОРИРОВАНИЯ АРТЕРИАЛЬНОГО ДАВЛЕНИЯ У ГИПЕРТЕНЗИВНЫХ ПАЦИЕНТОВ С ИШЕМИЧЕСКИМ ИНСУЛЬТОМ

Аннотация*. Цель работы – изучить особенности профиля артериального давления по данным суточного мониторирования у больных гипертонической болезнью, осложненной ишемическим полушарным инсультом. Обследовано 118 больных гипертонической болезнью (медиана возраста 62 (56;72); 33 % лиц мужского пола): в первую группу вошло 35 человек с ишемическим полушарным инсультом в остром периоде, во вторую – 83 пациента с неосложненным течением. Группы отличались по индексу жесткости сосудистой стенки за 24 ч (0,57 (0,40;0,67) против 0,46 (0,35;0,59), соответственно; p=0,031), за ночной период (0,63 (0,31;0,86) против 0,44 (0,26;0,60), соответственно; p=0,013). Однако не было получено статистической разницы показателей симметричного индекса жесткости сосудистой стенки за 24 ч и симметричного уровня наклона за 24 ч. Таким образом, результаты исследования свидетельствуют о наличии*

достоверных различий групп гипертензивных пациентов с осложненным и неосложненным течением только по одному показателю амбулаторной жесткости сосудистой стенки.

Ключевые слова: *гипертоническая болезнь, ишемический инсульт, суточное мониторирование артериального давления, амбулаторный индекс жесткости сосудистой стенки, симметричный наклон, симметричный амбулаторный индекс жесткости сосудистой стенки*

Hypertension is one of the crucial health problems worldwide [1]. It can influence to the high level of stroke mortality and a high frequency of disability. Using the ambulatory blood pressure monitoring (ABPM) to determine the presence of abnormal BP is becoming standard practice in developed countries which may predicts future cardiovascular events better than clinic BP [2]. In last decade, it was described some new indexes which is calculated from the ABPM data. In particularly, the ambulatory arterial stiffness index (AASI) was shown as one of the strong predictor of stroke and cardiovascular mortality. However, there are some other ABPM parameters, like the symmetric AASI (Sym_AASI) and the symmetric slope (Sym_Slope), which have pure information about clinical prognostic value [3].

We assessed the hypothesis that hypertensive patients with acute ischemic stroke (IS) would have a considerable difference in the ABPM parameters, such as AASI, Sym_AASI, Sym_Slope in compression with inadequate control essential hypertensive (EH) individuals without acute stroke.

Methods. The study protocol conducted according to the Helsinki Declaration was approved by the Medical ethics committee of the Zaporizhzhia state medical university (Ukraine). Patients admitted to Zaporizhzhiia clinical hospital № 6 (stroke, cardiology, intensive care units) were conducted to this study. Information on demographics and clinical characteristics was extracted from patients' medical records and purpose-designed questions in the questionnaire. Diagnosis of stroke was confirmed with clinical examination and computed tomography scan or magnetic resonance imaging results, and ABPM was conducted on 4.2±2.3 days after the stroke onset. All the patients underwent ABPM which recorded using a bifunctional device (INCART, RF). After the baseline examination, participants were fitted with an ABPM device on their nondominant arm if there were no considerable difference of BP results. Appropriate cuff bladder size was determined based on arm circumference. For ABPM frequency of measurements was every 15-20 minutes throughout daytime and 30 minutes throughout nighttime. Daytime and nighttime ABPs were defined as the fixed period of time (from midnight to 06:00 $_{AM}$ for nighttime). Analysis was carried out using an oscillometric method.

Quality of the ABPM studies was defined by the length of time that the monitor was actually worn and the number of successful BP recordings. Monitors worn for ≥ 21 hours with ≥ 18 hours with ≥ 1 valid BP measured per two hours were acceptable for analysis, so that there were 14 measures for daytime and at least 7 measurements – for nighttime.

Upon completion of the 24-h ABP recording, the data are downloaded and analyzed statistically to calculate BP averages (i.e., 24-h, daytime and nighttime) as well as variations on the BP load. The indexes were calculated as described previously [3]. In brief, the AASI was calculated as one minus diastolic (DBP)

versus systolic blood pressure (SBP); the Sym_Slope was calculated as slope SBP-versus-DBP divided by correlation r; the Sym_AASI was founded as 1-1(1-AASI) / r in linear regression analysis.

Statistical analysis. Analyses were performed using the STATISTICA version 6 software (USA). The Shapiro–Wilk's test was used to test for deviation from normality. Continuous data as mean ± standard deviation or medians and interquartile ranges as appropriate after testing for normality of distribution. Categorical data are presented as percentages. Comparisons between groups were done using the χ^2tests and the Mann–Whitney *U* test as appropriate. Two-tailed *P* values < 0.05 were considered statistically significant.

The aim of the study is to determine ABPM indexes in essential hypertensive patients with ischaemic hemisphere stroke in compare with those in essential hypertensive patients. So, we investigated 118 patients (62 (56;72) years, 33 % male) with essential hypertension. There were two groups. The first group of patients (n=35) were in an acute phase of ischemic stroke (IS) and EH and the second one (n=83) with EH without acute stroke. Exclusion criteria were atrial fibrillation / flutter.

It was found significant statistician difference between the first and the second group of the average systolic blood pressure (BP) for 24 h (155 (136;170) vs. 142 (137;150), respectively; *P*=0.023), the AASI for 24 h (0,57 (0.40;0,67) vs. 0,46 (0.35;0.59), respectively; *P*=0.031), the AASI for night period of time (0.63 (0.31;0.86) vs. 0,44 (0.26;0.60), respectively; *P*=0.013). However, there were no statistician difference in DBP for 24 h period of investigation and the Sym_AASI, the Sym_Slope.

Blood pressure elevation is commonly observed in the acute phase of stroke [4, 143 p.]. Both stroke-specific and non-specific external stimuli as well as other transient factors may contribute to BP changes in patients with acute stroke. It was found that BP elevated in 70-80% of patients in the acute phase of stroke and approximately 30% remained hypertensive after 10 days after stroke onset [4, 143-144 p.]. Several studies have found the predictive value of arterial stiffness as intermediate end point. Particularly, the greater the arterial stiffness, the greater the number of cardiovascular events were [5]. However, it is not clearer is this index add extra information for future outcome of the stroke onset hypertensive patients.

In conclusion, this study shows that only the AASI was high in essential hypertensive individuals with acute phase of ischemic stroke in comparison to the same parameters of essential hypertensive patients without acute stroke. However, there no difference in groups of other new ABPM indexes, as the Sym_AASI and the Sym_slope.

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