

Excessive accumulation of candidate gene polymorphisms in young hypertensive patients as a factor of increasing incidence of arterial hypertension at a young age

V. Bondar, O. Yakimenko, K. Chernyshova, V. Klochko, D. Oliynyk, I. Maznichenko, H. Chernyshova, K. Bondar, V. Vasilets

Odessa National Medical University, Department of internal medicine, Odessa, Ukraine

Funding Acknowledgement: Type of funding sources: None.

The concept of accumulation of candidate genes (CG) polymorphisms in the realization of the hypertensive phenotype is perspective both in understanding about the arterial hypertension (AH) formation as a disease with a constant increasing incidence, and in prognosis and early prevention.

The purpose of the research was to check the hypothesis of excessive accumulation of genetic polymorphisms in young hypertensive patients compared with older hypertensive patients and non-hypertensive patients as a factor of the increasing morbidity of AH at a young age in the modern population. The prevalence of AH-associated polymorphisms in these groups was studied with the calculation of gene modification index (GMI).

Methods: 204 patients with AH (mean age 42,4 [18–75], m/f 108/96), (ESC/ISH 2018) and 102 patients without AH (mean age 40,1 [18–69], m/f 55/47) were examined. Hypertensive patients (HP) were divided into 2 groups depending on age (WHO, 2016): group 1 – young age from 18 to 44 y.o. (n=98, m/f 54/44); group 2 – older age – 45 y.o. and more (n=106, m/f 54/52); group 3 (control) – non-hypertensive patients (non-HP). Patients were analysed on the following CG polymorphisms by PCR: ADD1:1378, AGT:704, AGT:521, AGTR1:1166, AGTR2:1675, CYP11B2:-344, GNB3:825, NOS3:-786, NOS3:894. The GMI represents the percentage of “pathological” genotypes. The GMI from 0 to 20% was considered as low genetic risk (GR), from 21 to 40% – moderate GR, from 41 to 70% – high GR, from 71 to 100% – very high GR.

Results: In group 1 of young HP the average GMI was 60,2% [CI 95%, 24–79], while 7 (7.1%) patients had low GR, 22 (22,4%) patients had moderate GR, high GR – in 42 (42,9%), very high GR - in 27 (27,6%) patients. In group 2 of older HP the average GMI was 39,1% [CI 95%, 18–70], while 27 (25,5%) patients had low GR, 37 (34,9%) patients had moderate GR, high GR – in 25 (23,6%), very high GR – in 17 (16,0%) patients. In group 3 of non-HP the average GMI was 20,1% [CI 95%, 11–48], low GR was in 84 (82,4%) patients, moderate GR – in 13 (12,7%), high GR – in 5 (4,9%), very high GR was absent. Analyzing the indicators between the groups, a natural high significant difference of GR levels and the average GMI between HP and non-HP was revealed. So, the average GMI between groups 1 and 3 – (60,2% vs 20,1%, p=0,0002), between groups 2 and 3 – (39,1% vs 20,1%, p=0,002). Also, a significant difference of GR levels and average GMI was revealed between HP of young age and older age. Thus, the frequency of low GR was (7,1% vs 25,5%, p=0,004), high GR – (42,9% vs 23,6%, p=0,009).

Conclusions: The research has revealed a significantly higher accumulation of gene polymorphisms associated with AH at a young age compared to hypertensive patients of an older age and non-hypertensive patients, which is a strong factor influencing on the increasing incidence of AH at a young age and in the future can be used for the prognosis of the disease progress and early prevention.