

PROGNOSTIC SIGNIFICANCE OF STATIC ENDURANCE (HAND GRIP TEST) IN NORTHERN ARTERIAL HYPERTENSION

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INTRODUCTION

The latest investigations show that in newcomers in different countries of the world, blood pressure (BP) becomes higher in the course of time as compared to that of non-migrants, especially in Northern regions. In cardiology physical tests are used to detect persons at risk for cardiovascular diseases. Testing in dynamic regime (step-test, VEM, treadmill, etc.) is most wide-spread. Testing in static regime has not been investigated adequately, though being of low metabolic effect and mainly instropic influence, it gives some advantages in case of arterial early diagnosis of arterial hypertension (AH).

METHODS

A retrospective analysis of five year's worth of observations was performed to define the prognostic significance of testing on the static regime. A modified liquid dynamometer, USSR model DJ-3, was used in the Static Endurance 0.75 Test. Blood pressure readings were interpreted according to expert recommendations. A total of 396 persons from Siberia, 316 from the far north and 57 from Antarctica were examined.

RESULTS

Table 1 represents the results of the static endurance tests for the different geographic and climatic regions. Hand static endurance decreases in healthy people in severe ecological conditions and is shown to increase in those with borderline AH development.

Table 2 shows the static endurance test results for healthy people and those with BAH measured after different periods of residing in new regions.

Table 3 represents the hemodynamic indices on maximal load of a static exercise.

Table 4 shows the frequency of AH development for persons with different types of BP reaction to static exercise.

DISCUSSION

Primary examination of normotensive persons show about 50% normotonic type BP reactions, 38% hypertonic BP reactions and 12% hypotonic reactions. Seventy-six of the primary subjects who remained in the northern region for five years appear to be threatened by AH development due to professional activities (Table 4).

TABLE 1. INDICES OF STATIC ENDURANCE FOR DIFFERENT CLIMATIC AND GEOGRAPHICAL CONDITIONS (M + m, SEC)

PEOPLE OBSERVED	NO.	M	m	P
SIBERIA				
1. Healthy people	318	44.12	1.03	P1-3, 3-4, <0.05 (†)
2. BAH people	76	43.76	2.21	P1-5 <0.05 (F)
NORTH				
1. Healthy people	235	39.43	1.51	
2. BAH people	79	47.21	2.65	
THE ANTARCTIC				
1. Healthy people	48	41.13	2.74	
2. BAH people	9	48.67	6.4	

TABLE 2. HAND STATIC ENDURANCE FOR PRACTICALLY HEALTHY NORTHERN NEWCOMERS AND PERSONS WITH BAH (M + m, SEC)

DURATION OF STAYING IN THE NORTH	NN	PRACTICALLY HEALTHY PEOPLE	NN	PERSONS WITH BAH
0-6 months	1	39.35 + 2.25	6	47.34 + 3.03
7-12 months	2	39.51 + 2.24	7	47.03 + 2.95
13-19 months	3	43.12 + 2.19	8	46.54 + 2.65
19-24 months	4	42.36 + 2.11	9	46.18 + 3.15
5 years and more	5	43.74 + 2.16	10	48.75 + 2.87

P 6-1, 7-1, 8-1, 10-1, 6-2, 7-2, 8-2, 10-2, 10-3 (†)

TABLE 3. HEMODYNAMIC INDICES ON MAXIMUM LOAD OF STATIC EXERCISE

INDICES	SIBERIA		P	NORTH	
	HEALTHY	BAH		HEALTHY	BAH
HR, Min ⁻¹	113.6 ± 1.9	115.1 ± 2.0		112.4 ± 1.5	124.2 ± 4.1
SBP, mm Hg	150.4 ± 1.7	158.4 ± 2.4	<0.01	142.3 ± 2.1	159.1 ± 4.3
Double Product (HR X SBP)-1.2 mm Hg. min. 10	124.6 ± 3.0	132.8 ± 3.2		127.5 ± 3.0	139.8 ± 5.1
Time for returning to Normal (sec)	200 ± 12.5	261 ± 13.7	<0.05	288 ± 11.6	332 ± 19.4

TABLE 4. FREQUENCY OF AH DEVELOPMENT FOR PERSONS WITH DIFFERENT TYPES OF BP REACTIONS TO STATIC EXERCISE

TYPE OF BP REACTION	NUMBER OF PEOPLE OBSERVED - 5 YEARS	NUMBER OF PEOPLE DEVELOPING AH	AH DEVELOPMENT FREQUENCY
1. Hypertonic	31	10	32.26%
2. Normotonic	36	7	19.44%
3. Hypotonic	9	1	11.1%

CONCLUSIONS

In the case of hyperactive BP response to static hand-grip testing, the risk of AH development is two times more for northern newcomers as compared

with normoreactive persons. It is three times more likely in comparison with hyporeactive type persons. Hand-grip testing in the static regime can be successfully applied to reveal persons threatened by possible development of "northern" AH.