

*Materials of Conferences***SOME SHOWINGS OF VARIABILITY OF HEART RATE WITHIN YOUNG BADMINTON PLAYERS**

Chan Dyk Njan

*Kuban state university of physical culture, sport and tourism, Krasnodar, e-mail: Lehanxee\_0901@mail.ru*

In the opinion of many authors (A.V. Polustruev, 2002; A.V. Sherbakov, 2009; S.A. Kosenchuk, 2010; and others.), modern sport badminton is notable for the specific of approach to the train and competitive process, because the result depends on the whole complex of the components: technically tactical training, functional and psychological condition. Very important component of train process is accordance of physical load to the current functional condition. One of the most objective criterions of estimation of sportsmen's current functional condition is showing, which displays the condition of mechanisms of vegetative regulation of cardiac activity.

For examination of sportsmen's functional condition there becomes more and more popular the analysis of variability of heart rate (VHR), which is an integral showing of functional condition of cardiovascular system and organism in whole.

**The aim** of the research was examination of some showings of variability of heart rate within young badminton players.

The research was carried out at the base of «Specialized Children and Youth School of Olympic Reserve №9», (Krasnodar) and specialized SCYSOR of Krasnodar krai in the city of Korenovsk and Dinskaya village, there were examined 35 badminton male players at the age of 17-21, who was qualified as master of sports. The analysis of variability of heart rate was carried out with the use of hardwarily program coplex «BHC-Spector» of «Neurosoft» firm (Russia, Ivanovo).

For the screening estimation the most informative are the showings of cardiointervalography by R.M. Baevski, 1988: Mo – mode, AMo – Amplitude of mode, VS – Variational swing, AQ – Average quadratic declination, IV – index of voltage.

As the results of carried out researches show the examined young badminton players are able to be divided by their vegetative status: with the presence of normotonia – 22, parasympathicotonia – 10, sympathicotonia – 3.

Received facts allow to take into consideration the degree of tension of central mechanisms of regulation of young sportsmen at the process of their adaptation to the changing invironment impact.

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**PECULIARITIES OF NITROUS OXIDE STRESS-REACTION AND METABOLISM AMONG PERSONS OF YOUTHFUL AGE WITH VARIOUS LEVELS OF NORMAL DIASTOLIC ARTERIAL PRESSURE**

Kuvshinov D.Y.

*Kemerovo state medical academy, Kemerovo, e-mail: fisiolog@mail.ru*

An increase in arterial pressure (AP) is the leading cause of death among the population of the world, strong and independent risk factor of heart-vascular diseases, and its role exceeds the contribution of smoking, hyperglycemia, dislipidemy, and obesity. This risk has two thresholds: it grows along with AP! Under physical or mental strain, in terms of stress, systolic pressure alters in larger scale than diastolic, but the latter is paid little attention to.

**The research objective** is to estimate the relation character between normal dualistic arterial pressure with the level of stress-activity and biochemical markers (NO) among young people.

**Methods and materials.** The research has been carried out upon almost healthy students of 17-21 years old of the first and the second year of medical and paediatric faculties of medical academy. All tests were carried out in laboratory conditions at morning hours (8,00 to 12 a.m.) with a regulated handwritten consent od students.

To estimate stress-reactivity (SR) we used six different methods:

- 1) color test of Lusher (L.N. Sobchick, 1990);
- 2) questioning of J. Taylor to reveal the anxiety level (A.B. Leonova, V.I. Medvedev, 1981);
- 3) evaluation of «individual minute» (Y.O. Alyanchikova, A.G. Smirnov, 1997);
- 4) iridoscopic definition of the number of iris nervous rings (E.S. Velhover and others, 1989);
- 5) functional probe «Mathematic calculation» (V.I. Kiselev and pthers, 1989);
- 6) automatic analysis of heart rhythm with usage of apparatus-program complex «Chronocard 2.2» to evaluate the index of regulatory systems' tension (IRST) (R.M. Bayevskiy, 1079).

All SR parameters were estimated via ranging into high, average, and low (3, 2, and 1 point correspondingly), sum SR was calculated.

To receive an express-evaluation of physical healthiness we used a method, developed under the supervision of professor G.L. Apanasenko (1988). The degree of extra-introversion and neurotism was defined via the question list of G. Aizenk (1992).

To define the level of nitrous oxide (NO) metabolites among 123 students (60 young men and 63 women) we undertook an intake of alveolar air and its condensation until the discharge of 1,5-2 ml of fluid. Prior to that at the level of shoulder artery arterial pressure (AP) and pulse frequency (PF) were defined by a device «Omron MX-3». The estimation of sum concentration of nitrites and nitrates (CNN) – stable nitrous oxide metabolites – in the concentration of alveolar air was carried out through restoration of nitrates back to nitrite-anions under an impact of coppered cadmium under pH = 9. The concentration of nitrite-anions was defined with Griss reactive that was mixed with an equal volume of the studied probe; absorption under the wave length of 550 nm was estimated on the analyser SpectraCount (Packard, USA). CNN was defined according to the metering

curve with usage of sodium nitrite (V.I. Buvaltsev and others, 2002).

Statistic processing was carried out with an applied program package «Statistika 5.5».  $M$  – selective average, and  $m$  – error of average were defined. The reliability of inner-group differences under the inspection of statistic hypothesizes in our research was defined with criterions of Mann-Witney (U-criterion), criterion of Wilcoxon. Correlation coefficient of Spirman was calculated as well.

**The research results.** All the studied were divided into 3 classes of normal diastolic pressure: 60-79 mm of mercury – optimal ADP, 80-84 mm of mercury – normal ADP, 85-89 mm of mercury – high normal ADP. Persons who received 3 or less points in the express-evaluation of healthiness level by G.L. Apanasenko were excluded from the further result analysis.

Table 1

Parameters of stress-reactivity and CNN among young men with different levels of normal ADP

Indexes	Persons with optimal ADP	Persons with normal ADP	Persons with high normal ADP	$p$
	$n = 44$	$n = 10$	$n = 5$	
ADP, mm of mercury	70,11 ± 0,74	82,20 ± 0,47	87,60 ± 0,93	
Average AP, mm of mercury	128,61 ± 1,72	134,00 ± 3,01	131,00 ± 3,83	
Cardiac rate	70,57 ± 1,51	76,40 ± 2,43	76,00 ± 2,92	
Height, cm	178,55 ± 1,13	180,6 ± 1,59	178,8 ± 2,85	
Body mass, kg	69,97 ± 1,52	70,50 ± 1,86	76,40 ± 6,73	*
Introversion, points	12,40 ± 0,47	12,60 ± 1,03	11,80 ± 1,62	
Neurotism, points	7,68 ± 0,72	7,30 ± 1,36	5,00 ± 0,89	*
IRST, point	117,59 ± 11,32	122,30 ± 22,78	145,60 ± 35,01	*
Sun heart rate, points	9,24 ± 0,24	9,89 ± 0,42	9,20 ± 0,37	
CNN, mcM/l	$n = 42$ 7,44 ± 0,94	$n = 10$ 5,38 ± 0,83	$n = 4$ 3,76 ± 0,61	*

Table 2

Parameters of stress-reactivity and CNN among young women with different levels of normal ADP

Indexes	Persons with optimal ADP	Persons with normal ADP	Persons with high normal ADP	$p$
	$n = 90$	$n = 18$	$n = 5$	
ADP, mm of mercury	72,55 ± 0,5	82,00 ± 0,41	88,00 ± 0,68	
Average AP, mm of mercury	116,96 ± 0,98	124,00 ± 2,05	124,00 ± 2,37	
Cardiac rate	75,99 ± 0,92	82,42 ± 3,14	77,67 ± 3,62	*
Height, cm	165,78 ± 0,59	162 ± 1,56	166,83 ± 2,94	
Body mass, kg	54,64 ± 0,7	54,14 ± 1,67	56,51 ± 1,77	
Introversion, points	11,94 ± 0,35	10,61 ± 0,78	11,83 ± 0,79	
Neurotism, points	9,06 ± 0,47	11,83 ± 1,08	9,33 ± 1,56	*
IRST, point	118,83 ± 9,66	155,64 ± 29,98	105,9 ± 40,22	*
Sun heart rate, points	9,47 ± 0,19	11,21 ± 0,46	10,00 ± 0,63	
CNN, mcM/l	$n = 42$ 8,24 ± 0,58	$n = 10$ 7,96 ± 2,42	$n = 3$ 7,24 ± 1,20	

The majority of young men (44 persons) had an optimal arterial diastolic pressure (ADP), those with optimal ADP also had the lowest body mass. According to the sum HR groups differed insignifi-

cantly, and the level of neurotism was even lower among persons with normal ADP. The comparison of NO metabolites concentration in the condensate of the inhaled air showed us that the highest con-

centration of it have persons with optimal ADP, and the lowest – those with high normal ADP. Diastolic pressure correlated with CNN among the young men with optimal ADP ( $r = -0,38$ ,  $p = 0,0144$ ), and among those with high normal pressure – with IRST ( $r = 0,79$ ,  $p = 0,0327$ ).

The results' analysis among the young women showed us that the majority of the studied has an optimal ADP level. Differences in height and mass were unreliable, a trend towards body mass growth was observed among the patients with high normal ADP. Persons with high normal pressure had higher indexes of neurotism, stress-reactivity, including high IRST parameters. Differences in CNN carries a character of trend – the highest concentration was observed among the patients with optimal ADP.

According to the described data we can suppose that for young men humoral factors, particularly nitrous oxide production are more important in the process of dualistic pressure regulation, while for women stress prevails the stress factor. Besides, young women with normal pressure, obviously, form even higher risk group than persons with high normal pressure. However, additional research is required for more detailed answer to this question.

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#### **MRI OF ADRENAL GLANDS IN PATIENTS WITH HYPERTENSION-VERGE NORMS AND PATHOLOGY**

Lukyanenok P.I.

*Institute of Cardiology of the Siberian Branch  
of the Russian Academy of Medical Sciences, Tomsk,  
e-mail: paul@cardio.tsu.ru*

Adrenal condition assessment in patients with hypertension by MRI has certain characteristics, because the shape, size and position of the adrenal gland are different. At present, information on how to conduct a survey of the adrenal gland based on morphological (death), as well as norms derived with x-ray computer tomography. Simple transfer of the data on MRI survey on low-floor systems cannot be applied because the dimensions obtained when CT and MRI are significantly different, so much so that the definition of a number of parameters for CT for frontal sections without reconstruction images difficult. In particular this applies to the frontal or sagittal sections, where not only describes the rules for the adrenal glands of these cross-sections, but even among the MRI CT they may vary in degrees of intensity signal from cerebral and brain substance evaluation used sequences of sections and the thickness of the slices.

Therefore we have decided to describe along with pathologies in patients with hypertension, normal values of the adrenal gland, which could then be used in the practice of doctors.

Adrenal survey conducted among 470 healthy persons (M-226, W-244) between the ages of 20 to 60 years. In the categories of age range with a difference at 10 years old were assessed the shape and dimensions of the adrenal gland in axial and frontal cross-sections at thickness of slices, 5 and 7 mm in T1 and T2 sequences with the parameters of the protocols used for kidney and adrenal glands. In axial and frontal cross-sections determined the height of the medial leg right and the left adrenal gland and the length of lateral leg. These two sections are determinative, since the legs of the adrenal gland can be arranged at an angle to each other and, consequently, sizing only one axial sections, may make the error in measurement.

Lateral leg length is measured from the beginning of the adrenal gland to visualization its merger with the medial leg at the level of the body in front and axial cross-sections; the height of the medial – maximum of visualization on axial and front-end transects To average the data standards for adults, we have combined age ranges 21-40 years and 51 and older in two groups, to some extent through simplification. This is done specifically because the age range of 1 to 20 law requires individual interpretation due to the growth of the organism. In the old, i.e. over 51 years during the life of the accumulated negative factors (weight gain, osteoporosis, reaction to stressful situations, metabolic diseases, etc.), including the individual modalities reaction of the adrenal gland that can cause changes in their form and structure.

According to the results of the measurements of the height of the medial leg right adrenal gland in the age group 21-40 years in the front rail was  $19,06 \pm 4,79$  mm; the length of the lateral –  $13,3 \pm 3,37$  mm. The dimensions of the medial leg left adrenal gland in norm in front-end transects were: the height of the medial leg –  $23 \pm 3,72$  mm; length of lateral leg –  $12,9 \pm 2,36$  mm.

In the older age group 51 years and more, these indicators were: the height of the medial leg right adrenal gland –  $21,54 \pm 3,23$  mm; length of lateral leg –  $12,63 \pm 3,44$  mm; the height of the medial leg left adrenal gland in front of cross-sections –  $22,2 \pm 5$  mm; length of lateral leg –  $16,66 \pm 3,71$  mm.

In axial transects the height of the medial leg right adrenal gland in the Group of 21-40 years old  $22,48 \pm 4,49$  mm; length of lateral leg right adrenal gland –  $13,34 \pm 3,51$  mm. Dimensions-height medial leg left adrenal gland in axial sections  $20,5 \pm 4,32$  mm; length of lateral leg left adrenal gland in axial transects  $14,94 \pm 3,54$  mm. In the older age group, the height of the medial leg left adrenal gland in axial transects was  $21,74 \pm 4,73$  mm; length of lateral leg –  $13,82 \pm 4,11$  mm.