

O. A. Serebrennikova¹, V. V. Semenchenko, S. V. Dmytrenko, A. I. Semenenko, O. L. Ocheretna, O. Ye. Maievskiy, A. V. Shayuk
 National Pirogov Memorial Medical University, Vinnytsya, Zhytomyr Ivan Franko State University

CORRELATION CONSTITUTIONAL PARAMETERS OF A BODY IN PRACTICALLY HEALTHY WOMEN OF MIDDLE INTERMEDIATE SOMATOTYPES WITH RHEOENCEPHALOGRAPHY INDICATORS

e-mail: oserebrennikoval@gmail.com

In practically healthy women from Podillia with middle intermediate somatotype, among the correlations of cerebral blood flow with anthropo-somatotopological parameters of the body, the highest percentage, mostly direct, reliable and unreliable connections of mean strength is established with the amplitude rheoencephalography parameters. Among the direct reliable and generally the average strength of the false correlations of time and derivative of the rheoencephalography parameters with constitutional parameters of the body, attention is drawn to the emergence of strong ties with time indices and an increase in the percentage of inverse relationships with the derivatives of the rheoencephalography parameters. In analyzing the correlations of different groups of anthropo-somatotopological parameters of the body with the parameters of cerebral circulation, it was established that the amplitude indexes have the highest relative percentage of connections with total, longitudinal, circumflex sizes and cephalometric indices; time indices - with the width of distal epiphyses of long tubular bones of the limbs and circumflexion dimensions; derivative indicators - with total, longitudinal dimensions, body diameters and width of distal epiphyses of long tubular bones of the extremities.

Key words: cerebral hemodynamics, anthropometric indices, practically healthy women.

The World Health Organization points to the steady increase in the number of diseases of the nervous system that have already gone beyond the indicators of tuberculosis, AIDS, ischemic heart disease, malignant tumors, diseases of the gastrointestinal tract and the respiratory system. The biggest part in the structure of lesions of this system is occupied by cerebrovascular diseases, the frequency of which continues to grow steadily [9]. For the purpose of non-invasive diagnostics of vascular pathology of the brain the irreplaceable and most valuable can be considered a rheoencephalography method, which allows obtaining information on such indicators as: peripheral vascular resistance, reactivity, tone and elasticity of the vessels of the brain of different caliber, the size of pulsed blood flow, outflow rates blood and symmetry blood flow. The study is carried out by passing a weak electric current of high frequency through the tissues of the brain with a subsequent recording of the value of electrical resistance of tissues. The method is safe and can be carried out for a long time and even at the patient's home [11]. However, the lack for more correct use of this method in practical medicine is the lack of information regarding the dependence of rheoencephalography parameters on the somatotype of a practically healthy person, which could serve as the basis for the establishment of normological parameters of indicators of cerebral circulation, depending on the peculiarities of the body structure. In Ukraine, the works devoted to the study of indicators of cerebral circulation in healthy individuals are not numerous, and therefore do not allow coverage of all strata of the population, however, confirm the existence of links between these indicators with the constitutional parameters of the body [3, 5, 6]. All this determines the relevance of further study of correlations between the anthropo-somatometric parameters of the human body and rheoencephalography indices.

The purpose of the work is to establish the peculiarities of the connections of the anthropo-somatometric parameters of the body of practically healthy women from Podillia of the middle intermediate somatotype with the parameters of cerebral circulation.

Material and methods. Primary anthropometric and rheoencephalography indices of practically healthy urban women of Podillia (n = 130) are taken from the data bank of the research center of the National Pirogov Memorial Medical University, Vinnytsya.

With the help of computer diagnostic complex, the automatic processing of the rheoencephalogram was performed with the definition of characteristic points on the curve, the main indicators, the formation and substantiation of the conclusion about the state of the circulatory system of the investigated area [12]. The following parameters of the rheoencephalogram were determined: amplitude - base impedance (Ohm); amplitude of systolic wave (Ohm); incision amplitude (Ohm); amplitude of diastolic wave (Ohm); amplitude of the phase of rapid blood filling (Ohm); time - duration of the heart cycle (s); length of the ascending part (s); duration of the downward part (s); duration of the fast blood filling phase (s); duration of the phase of slow blood filling (s); derivatives - dicrotic index (%); diastolic index (%); average speed of the phase of rapid blood filling (Ohm/sec); average speed of the phase of slow blood flow (Ohm/sec); index of total arterial tone (%); indicator of tone of arteries of large caliber (arteries of distribution) (%); index of tone of arteries of medium and small caliber (arteries of resistance) (%); the ratio of tone of arteries of different caliber (%).

Anthropometric study was carried out in accordance with the scheme of V.V. Bunak [2]. Craniometry included a definition: the girth of the head (glabella), sagittal arc, the largest length and width of the head, the smallest head width, face width and width of mandible [1]. The somatotype is determined by the method of J. Carter and B. Heath [4], and the component composition of the mass of the body - by the method of J. Matiegka [8] and additionally the muscular component - according to the formulas of the American Institute of Nutrition [7]. The evaluation of correlations of cerebral circulation with anthropo-somatometric parameters of the body of practically healthy women of the middle intermediate somatotype ($n = 23$) was performed in the statistical package "STATISTICA 6.0" using the Spirman statistics.

Results and its discussion. The analysis of the peculiarities of reliable and average strength of false correlations of constitutional parameters of the body with the indices of cerebral circulation of practically healthy women of the middle intermediate somatotype revealed the following multiple bonds: direct average strength significant ($r = 0.41 - 0.56$) and unreliable ($r = 0,30 - 0.41$) connections of the base impedance, amplitude of the systolic wave and the amplitude of the fast blood filling phase with all total, most longitudinal dimensions and half of the cephalometric indices, the basic impedance with practically all but the grips of the limbs, as well as practically all of the amplitude indices (with the exception of the base impedance) with waist circumference and chest; direct, mostly average strength significant ($r = 0.43 - 0.54$) and unreliable ($r = 0,30 - 0,38$), as well as strong ($r = 0,60-0,84$) connections duration phases rapid blood filling with all total, longitudinal, practically all circumflexion dimensions and indicators of the component composition of body weight (excluding fat); the reverse mean strength significant ($r = -0.42 - -0.46$) and unreliable ($r = -0.30 - -0.40$) bonds of the dicrotic and diastolic indexes with body length and half longitudinal dimensions, as well as the index the tone of arteries of medium and small caliber with a third of the circumferential dimensions and body diameters; direct, mostly average forces unreliable ($r = 0,30 - 0,40$) links of the average speed of the phase of fast and slow blood filling with the majority of total, longitudinal dimensions, half of the cephalometric indices and the bone component of the body mass, as well as the tone of the arteries of the large caliber with a majority of total and almost half of the length; the direct mean strength significant ($r = 0.43-0.50$) and unreliable ($r = 0.30-0.41$) connections of the ratio of tone of arteries of different caliber with the majority of total, circular, almost half of the longitudinal dimensions and practically all the diameters of the body. Quantitative analysis of the reliable and average strength false correlations of constitutional parameters of the body with the indicators of cerebral circulation of practically healthy women of the middle intermediate somatotype revealed the following distribution of links with different groups of indicators of cerebral circulation: with amplitude indicators - 89 out of 290 possible (30.7%), of which, 38 - 13.1% of reliable direct average forces; 45 - 15.5% of false direct middle forces; 6-2,1% of false reverse average strength; with temporal indicators - 59 out of 290 possible (20.3%), of which, 8 - 2.8% of reliable direct strong; 13 - 4.5% of reliable direct average forces; 27 - 9.3% of false direct middle forces; 1 - 0.3% of the true reverse average strength; 10 - 3.4% of unreliable reverse average strength; with derivative indicators - 94 out of 464 possible (20.3%), of which 16 - 3.4% of reliable direct average forces; 45-9.7% of false direct middle forces; 9 - 1,9% of the true reverse average strength; 24 - 5,2% of unreliable reverse average strength.

Quantitative analysis of the reliable and average strength false correlations of constitutional parameters of the body with the parameters of cerebral circulation of practically healthy women of the middle intermediate somatotype revealed the following distribution of relationships with the parameters of structure and body size: with amplitude indicators - cephalometric indices (14 - 40.0% of the total cephalometric indices; of which 11.4% are reliable direct average forces; 25.7% are false direct average forces; 2.9% are false reverse average forces); total body size (12 - 80,0% of all total sizes; of which 60,0% of reliable direct average forces; 20,0% of false direct average forces); longitudinal dimensions of the body (13 - 52,0% of the total number of longitudinal dimensions; of which 36,0% of the reliable direct average forces; 16,0% of the false direct average forces); width of distal epiphyses of limb long bones (3 - 15.0% of the total number of these indicators, all unreliable direct mean forces); body diameters (6 - 15.0% of the total number of diameters of the body; of which 10.0% of the true direct mean strength; 5.0% of the false direct average forces); the circumferential dimensions of the body (27 - 36.0% of the total number of circumferential sizes; of which 14.7% are reliable direct average forces; 18.7% are false direct middle forces; 2.7% are false reverse average forces); the thickness of skin and fat folds (8 - 17,8% of the total number of these indicators; of which 13,3% of the unreliable direct average strength; 4,4% of the unreliable reciprocal average strength); components of the somatotype according to Hit-Carter (1 - 6.7% of the total number of components of the somatotype, all unreliable reciprocal average forces); indicators of the body component composition (5 - 25.0% of the total number of components of the body composition; including 5.0% of the direct reliable median power, 20.0% of the unreliable direct mean strength); with time indicators - cephalometric indices (2 - 5.7% of the total number of cephalometric indices, all unreliable direct average forces); total body dimensions (3 - 20.0% of the all total

sizes; of which 13.3% of reliable direct strengths; 6.7% of reliable direct average forces); longitudinal body dimensions (5 - 20.0% of the total number of longitudinal dimensions; of which 4.0% of reliable direct average forces; 16.0% of false direct average forces); the width of distal epiphyses of limb long bones (11-55.0% of the total number of these indicators; of which 5.0% reliable direct average forces; 35.0% of unreliable direct average forces; 15.0% of unreliable reciprocal average forces); diameters of the body (9 - 22.5% of the total number of diameters of the body; of which 5.0% of reliable direct strengths; 2.5% of reliable direct average forces; 5.0% of false direct average forces; 5.0% of false reverse average force); the circumferential dimensions of the body (22 - 29.3% of the total number of circumferential dimensions; of which 4.0% are reliable direct forces; 10.7% reliable direct average forces; 10.7% unreliable direct average strength; 1.3% reliable reverse average force; 2.7% false reverse average strength); the thickness of skin and fat folds (2-4.4% of the total number of these indicators; of which, 2.2% of false direct average strength; 2.2% of false reverse average strength); components of the somatotype according to Hit-Carter (1 - 6.7% of the total number of components of the somatotype, all unreliable direct average forces); the components of the body composition (4 - 20.0% of the total number of components of the body composition; of which 5.0% reliable direct strong; 5.0% reliable direct average strength; 5.0% false direct average strength); with derived indicators - cephalometric indices (9 - 18.8% of the total number of cephalometric indices; of which, 4.2% of the reliable direct average forces; 8.3% of the unreliable direct average forces; 2.1% of the true reciprocal average strength; 4.2% of unreliable reverse average strength); total body size (10 - 41.7% of the all total sizes; of which 33.3% of the unreliable direct mean strength; 8.3% of the unreliable reverse average strength); longitudinal body dimensions (16 - 40.0% of the total number of longitudinal dimensions; of which 2.5% of reliable direct average forces; 25.0% of unreliable direct average forces; 7.5% of the true reverse average strength; 5.0% unreliable reverse average strength); the width of distal epiphyses of limb long bones (8 - 25.0% of the total number of these indicators; of which 9.4% are reliable direct average forces; 6.3% of the true limb average strength; 9.4% of the false limb average forces); body diameters (16 - 25.0% of the total number of body diameters; of which 4.7% are reliable direct average forces; 10.9% of the unreliable direct average forces; 3.1% of the true limb average strength; 6.3% unreliable limb average strength); circumferential body dimensions (23 - 19.2% of the total circumferential dimensions; of which 5.0% of reliable direct average forces; 7.5% of unreliable direct average forces; 6.7% of unreliable reverse average forces); the thickness of skin and fat folds (7 - 9.7% of the total number of these indicators; of which 5.6% of the false direct middle forces; 1.4% of the true reverse average strength; 2.8% of the unreliable reverse average strength); components of the somatotype according to Hit-Carter (1 - 4.2% of the total number of components of the somatotype, all unreliable reciprocal average forces); indicators of the body composition component (4 - 12.5% of the total number of components of the body composition; of which 3.1% of the reliable direct mean strength; 9.4% of the unreliable direct mean strength). Comparing the obtained correlations in women of the middle intermediate somatotype with correlations of similar indices in practically healthy women from Podillia mesomorphic somatotype [10] draw attention the expressed differences in established relationships. Thus, in women of mesomorphic somatotype, multiple reliable direct, mostly average forces ($r = 0.30 - 0.36$) time relations of rheoencephalography parameters are established only between the duration of the ascending part and the phase of rapid blood filling with the width of the distal epiphysis of the forearm, hip and shin; and among the amplitude and derivative of the rheoencephalography parameters - only reliable reverse of the average strength ($r = -0.32 - -0.42$) relationships between the amplitude of the systolic wave, the amplitude of the fast blood filling phase, the average speed of the fast and slow blood filling phase with a thickness of one third of skin and fat folds, endomorphic component of somatotype and fatty component of body weight. Other parameters of the rheoencephalogram in practically healthy women of the mesomorphic somatotype have only a few reliable weak and average strength connections with the anthropometric and somatometric parameters of the body. The expressed differences in the results of the correlation analysis between the indicators of cerebral circulation and the anthropo-somatometric parameters of the body in women of different somatotypes confirm the need to take into account the constitutional type of person to create the normological parameters of indicators of cerebral circulation.

Conclusion

1. In practically healthy women of Podillia of the median intermediate somatotype, among correlations of cerebral blood circulation with anthropo-somatotopological parameters of the body, the highest percentage, mainly direct, reliable and unreliable mean strength connection is established with the amplitude rheoencephalography parameters (13.1 and 15.5% respectively). Among the direct reliable and predominantly average strength of false correlations of time (correspondingly 7.3 and 9.3%) and derivatives (respectively 3.4 and 9.7%) of rheoencephalography parameters with anthropo-somatotopological parameters of the body attract attention the emergence of strong links with time indices (2.8%, in most cases with the duration of fast

blood flow phases) and an increase in the percentage of inverse relationships with the derivatives of the rheoencephalography parameters (7.1%, in most cases with the diastolic and diastolic indexes and an indicator of the tone of arteries of medium and small caliber).

2. In analyzing the correlations of different groups of anthropo-somatotopological parameters of the body with the parameters of cerebral circulation of practically healthy women of the middle intermediate somatotype, it was established that the amplitude parameters of the rheoencephalogram have the highest relative percentage of connections with total (80.0%), longitudinal (52.0%), circumflexion dimensions (36.0%) and cephalometric indices (40.0%); time indices of the rheoencephalogram - with the width of distal epiphyses of long limb bones (55.0%) and girths data (29.3%); derivatives of the rheoencephalogram - with total (41.7%), longitudinal dimensions (40.0%), body diameters and width of distal epiphyses of long limb bones (by 25.0%).

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Реферати

КОРЕЛЯЦІЇ КОНСТИТУЦІОНАЛЬНИХ ПАРАМЕТРІВ ТІЛА ПРАКТИЧНО ЗДОРОВИХ ЖІНОК СЕРЕДНЬОГО ПРОМІЖНОГО СОМАТОТИПУ З РЕОЕНЦЕФАЛОГРАФІЧНИМИ ПОКАЗНИКАМИ

Серебренникова О.А., Семенченко В.В., Дмитренко С.В., Семененко А.І., Очеретна О., Маєвський О., Шаюк А.В.

У практично здорових жінок Поділля середнього проміжного соматотипу, серед кореляцій показників церебрального кровообігу з антропо-соматотипологічними параметрами тіла, найбільший відсоток, переважно прямих достовірних і недостовірних середньої сили зв'язків встановлений з амплітудними показниками реоенцефалограми. Серед прямих достовірних та переважно середньої сили недостовірних кореляцій часових та похідних показників реоенцефалограми з конституціональними параметрами тіла привертає увагу поява сильних зв'язків із часовими показниками і збільшення відсотка зворотніх зв'язків із похідними показниками реоенцефалограми. При аналізі кореляцій різних груп антропо-соматотипологічних параметрів тіла з показниками церебрального кровообігу встановлено, що амплітудні показники мають найбільший відносний відсоток зв'язків із тотальними, поздовжніми, обхватними розмірами і кефалометричними показниками; часові показники – з шириною дистальних епіфізів довгих трубчастих кісток кінцівок і обхватними розмірами; похідні показники – з тотальними, поздовжніми розмірами, діаметрами тіла і шириною дистальних епіфізів довгих трубчастих кісток кінцівок.

Ключові слова: церебральна гемодинаміка, антропометричні показники, практично здорові жінки.

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КОРЕЛЯЦИИ КОНСТИТУЦИОНАЛЬНЫХ ПАРАМЕТРОВ ТЕЛА ПРАКТИЧЕСКИ ЗДОРОВЫХ ЖЕНЩИН СРЕДНЕГО ПРОМЕЖУТОЧНОГО СОМАТОТИПА С РЕОЭНЦЕФАЛОГРАФИЧЕСКИМИ ПОКАЗАТЕЛЯМИ

Серебренникова О.А., Семенченко В.В., Дмитренко С.В., Семененко А.И., Очеретная О., Маевский А.Е., Шаюк А.В.

У практически здоровых женщин Подолья среднего промежуточного соматотипа, среди корреляций показателей церебрального кровообращения с антропо-соматотипологическими параметрами тела, наибольший процент, преимущественно прямых достоверных и недостоверных средней силы связей установлен с амплитудными показателями реоэнцефалограммы. Среди прямых достоверных и преимущественно средней силы недостоверных корреляций часовых и расчетных показателей реоэнцефалограммы с конституциональными параметрами тела привлекает внимание появление сильных связей с часовыми показателями и увеличению процента обратных связей с расчетными показателями реоэнцефалограммы. При анализе корреляций разных групп антропо-соматотипологических параметров тела с показателями церебрального кровообращения установлено, что амплитудные показатели имеют наибольший относительный процент связей с тотальными, продольными, обхватными размерами и кефалометрическими показателями; часовые показатели – с шириной дистальных эпифизов длинных трубчатых костей конечностей и обхватными размерами; расчетные показатели – с тотальными, продольными размерами, диаметрами тела и шириной дистальных эпифизов длинных трубчатых костей конечностей.

Ключевые слова: церебральная гемодинамика, антропометрические показатели, практически здоровые женщины.

Рецензент Гунас І.В.