P.I. Kudrina, A.L. Aryev

Prevalence of chronic kidney disease in the elderly and senile patients with dyscirculatory encephalopathy

ABSTRACT

THE AIM OF THE RESEARCH. Cerebrorenal relationships between the early signs of cerebral atherosclerosis and the level of the calculated glomerular filtration rate (GFR) with account of the influence of risk factors (RF) of cerebrovascular diseases (CVD) in elderly and senile patients of the Republic Sakha (Yakutia), suffering from chronic brain ischemia (CBI) depending on the region of residence were under study.

PATIENTS AND METHODS. The study included 245 patients from 60 to 89 years, comparable by age and sex, were divided into two groups according to region of residence (Arctic and Antarctic), for two age groups (elderly and senile age) and by the sex. The main method of the study of cerebral hemodynamics in this work has been ultrasound dopplerography (usdg). Doppler sonography survey with color scanning and spectral Doppler analysis of the cervical arteries on extracraniallevel was performed according to standard method for ultrasound systems ACUSON «Sequoia-512» sensor linear format of the generated frequency of the ultrasonic signal 4 and 8 MHz in the ever-wave mode. All of the sample investigated the functional state of the kidneys. GFR, was determined by the settlement formulas; Cockcroft&Gault GFR= (140-age) × body weight (kg) 810* creatinine of blood (mol/l)×E, where E-1,23 for men, 1,04-for women and MDRD: GFR= 186×(creatinine of blood mg/dd)-1,154 × (age)-0,203 × (0,742 for women) with subsequent determination of the stages of chronic kidney disease. We used a brief MDRD formula, which of laboratory indicators requires only establishing the values of concentrations of serum creatinine.

RESULTS. The direct positive correlation between the thickness of intimate-media (TIM) and the average of the FCPF, and also found a statistically significant relationship between factors in the onset and progression of GFR and CBI, dependent on region of residence.

CONCLUSION. Features of cerebrorenal relations of persons of elderly and senile age in the Republic of Sakha (Yakutia) are caused by region of residence.

Keywords: the region of residence, ecology, elderly and senile age, chronic brain ischemia, chronic renal disease.

INTRODUCTION.

At the present time, there is a lot of scientific works, devoted to the chronic brain ischemia and chronic kidney disease. The study of vascular-cerebral diseases is one of the priority directions of domestic neurology, takes into account the higher prevalence of these diseases, frequent disability and mortality of patients [1]. In the last few years, there has been increasing medical and social significance of chronic forms of ischemic cerebrovascular diseases [6].

SKF is considered to be the most accurate indicator, reflecting the functional state of kidneys. focusing on her value of note stage of CKD. Currently, according to the large population-based

registers the prevalence of CKD is not less than 10%, reaching 20% or more for certain categories of persons (older, diabetes of the 2nd type) [2,3].

PATIENTS AND METHODS

The study included 251 patients with chronic brain ischemia (CBI) of the I and II stages. Diagnosis of CBI was placed respectively classification of vascular lesions of the brain Institute of neurology RAMS (1985), the wording of the diagnosis in accordance with ICD-10 . Criterion for the diagnosis was also instrumental confirmed by the defeat of vessels of a brain with the relevant clinical picture of the stages of the CBI (CBI -I; CBI -II). Proceeding from the purpose of all observations have been subdivided into the second group. Criteria of division is a region of residence. In accordance with the classification of E.B.Shmidt (1985) depending on the stage of the CBI groups are divided into subgroups; A patients with CBI - I and B patients with CBI -II stages.

I group observations made 174 patients in the subgroup A 87 , in the subgroup of B-87 living in the Arctic zone, the II group of 177 patients in the subgroup A -90, in the subgroup of B - 87, living in the Viljujsky zone . These zones are not the same due to its natural and ecological peculiarities, and people living in them, differed by the way of life, the nature of the basic lessons, the level of civilization, way of life, peculiarities of power. The main method of the study of cerebral hemodynamics in this work it has been ultrasound dopplerography (USDG). Doppler sonography survey with color scanning and spectral Doppler analysis brachicephalic arteries in extracranial level was performed according to standard method for ultrasound systems ACUSON «Sequoia-512» sensor linear format of the generated frequency of the ultrasonic signal 4 and 8 MHz in the ever-wave mode.

Examined both common carotid arteries in the longitudinal and transverse planes with a view to identifying cross-section, in which атеросклеротическая a plaque had the greatest size. Determining the percentage of stenos in the zone of maximum narrowing of the lumen of the artery, evaluated the characteristic plaques [4].

For descriptions of quantitative data calculated the mean value and the standard deviation. To establish the amount of the contribution of the factors in the General regularity contingency tables we focused on the value of a standardized balance in cells. For the assessment of the interlink ages quantitative variables the rank correlation was used. In all of the used statistical criteria for the threshold level of importance we took a value of $p<0.05$ [9].

THE RESULTS OF THE STUDY

In addition, between the indicators of the Cockcroft&Gault and MDRD installed private correlation in the control of influence of age: r=0.31 times when p=0,000. The initial atherosclerotic features of brain vessels and their influence on the functional state of the kidneys. The analysis of the severity of atherosclerosis changes of the main arteries of the heads of the studied shows the significant difference of the coefficient of asymmetry of blood flow, the characteristics of plaques (localization, surface structure, size, shape) and the thickness of the complex intimate media in the main arteries of the scalp.

On the occurrence of plaques the group is characterized by the lowest frequency of occurrence of atherosclerosis plaques (73%) in comparison with II (57.6 per cent). It should be noted that in group I of plaque size of more than 10 mm occur in 2 times less than in II ($\chi 2$=18,46, st.sv. 4, p=0.001) [7].

A comparative analysis of the thickness of the complex intimae-media according to gender shows that, on average, men have the thickness of the complex интимы-media more than the similar indicator for women (1,11±0,31; 1,18±0,31 against 1,08±0,31 and 1.14±0,30).

DISCUSSION

The purpose of our work was to determine the cerebro-renal interrelationships between early features of cerebral atherosclerosis (TIM and ASP) and the level of the calculated filter glomerular filtration rate with account of the influence of the traditional factors cerebrovascular diseases in elderly and senile patients depending on the region of residence.

Decrease in GFR serves as the main marker of a pathological condition-CKD, on the basis of which , as it is said in the literature, there is fibrosis kidney parenchyma, leading to the loss of all the functions [5]. Decrease in GFR and MAY serve as main markers of pathological state of chronic kidney disease (CKD). It is known that the vital resources of the human Ecology depends on negative factors of the environment (the bad ecology). Messages about the connection of morbidity CBI and CKD pollution of the environment are ambiguous and contradictory. A number of researchers have proven the strengthening of the risk of cerebrovascular disease through air pollution (Environment). Identification of high frequency of CKD patients with CBI in the assessment of the functional state of kidneys with the help of formulas indicates the simultaneous hypertension restructuring and atherosclerosis changes, as described in the literature [11] the different structural and functional levels of the brain and kidneys.

At the present time there is no doubt that the AG is one of the most important RF development and mechanism of progression of the CVD and CKD. Dyslipidemia occupies the leading position among the RF CVD and worsens the prognosis of any renal disease, and diabetic

nephropathy is one of the main reasons of development CKI. Is known from the literature that heart disease and kidney are interdependent and continuous chain of events, which some call cardiorenal continuum, and others cardiorenal syndrome. As they say in the literature, the risk of developing CKD increases with age [10], the decline in GFR with age was observed in our study [8].

Statement in these patients with different stages of the CBI thickness intimae-media of the common carotid artery (CCA) more than 0.9 mm and the apparent existence of atherosclerosis plaques implies a high probability of widespread atherosclerosis in these patients [12].

On the basis of our research it can be stated that the development and progression of chronic brain ischemia and chronic kidney disease in the studied patients of elderly and senile age goes in parallel, in this case the patients living in ecologically polluted Viljujsky region, revealed the direct and indirect signs of a more pronounced pathological aging of the central nervous system, which manifests itself in a more distinct atherosclerotic vascular disorders of the brain, as well as more severe renal dysfunction.

CONCLUSION

Thus, in patients with HIM takes place denominated atherosclerotic changes in blood vessels of the brain in the form of detection of atherosclerosis plaques, the combined stenos and high values of thickness of the complex intimae-media, dependent on the ecological state of region of residence.

Established positive relationship between RF onset and progression of CBI and the level of GFR demonstrates the unity of FR vascular lesions of the brain and CKD, the frequency of RF higher in patients residing in ecologically polluted region.

When conducting the correlation found a close relationship between atherosclerotic vascular changes in the brain and reduced kidney function, which points to the associated pathology of the kidney and the brain, which in turn determines a high risk of further progression of CBI with reduced kidney function.

When making heavier stage of the CBI and the declining kidney function, which indicates that the growth is also the stage of CKD and this explains the parallelism of the processes atherogenesis of the brain and the kidneys.

References

1. Vereschagin N. V., Varakin Yu.Ya. Prevention of acute brain blood circulation disorders: theory and reality /N. V. Vereschagin, Yu.Ya. Varakin // Zhurnal nevrologii I psikhiatrii. - 1996. - P. 5-9.

2. Myakotnykh V.S. Topical issues of neurogeriatrics / V.S. Myakotnykh, S.A.Starikov, V.S. Khluzov // Yekaterinburg: UIF Nauka.- 1996. - 320 p.

3. Myasoyedova E.E. Asymptomatic carotid atherosclerosis and predictors of development of rheumatoid arthritis // E.E. Myasoyedova, S. E. Myasoyedova, S.V. Obzherina // Klinicheskaja medicina.- №6.- 2012.- P.48-50.

4. Savvinov D.D., Petrova P. G. The habitat and human health in the North / D.D. Savvinov, P.G. Petrova // Ekologo-meditsinskie aspektu. – Novosibirsk, 2005. – P. 23-27.

5. Smirnov A.V. Cardiorenal continuum: pathogenetic basis of preventive nephrology / A.V. Smirnov, A.V. Dobronravov, I.G. Kayukov / Nefrologija.- 2005.- № 9 (3).-P. 7-15.

6. Yakhno N. N. Topical issues of neurogeriatrics / N.N.Yakhno, I.V. Damulin // Achievements in neurogeriatrics.- 1995.- 9-39 p.

7. Davies M. J., Thomas A.C. Plague fissurring – the cause of acute myocardial infarction, sudden ischemic death, and crescendo angina // M.J. Davies, A.C. Thomas. Br. - Heart J. 1985. V. 53. №4. P.363-373.

8. Go A.S. Chertow G.M. Fan D [et al.]. Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization / A.S. Go, G.M. Chertow - N. Engel. J. Med. 2004; 351 (13): P.1296-1305.

9. Liapis C.D., Kakisis J.D., Kostakis A.G. Carotid Stenosis. Factors affecting symptomatology / C.D. Liapis, J.D. Kakisis, A.G. Kostakis. - Stroke 2001; 32: P.2782-2786.

10. Locatelli F, Del Vecchio L, D'Amico M, Andrulli S. Is it the agent or the blood pressure level that matters for renal protection in chronic nephropathies / F. Locatelli, L. Del Vecchio, M. D'Amico, S. Andrulli. - J Am Soc Nephrol 2002; 13[Suppl 3]: P.196-201.

11. Mann JFE. Cardiovascular risk in patients with mild renal insufficiency: implication for the use ACE inhibitors. La Presse Medicale 2005; 34(18): P.1303-1308.

12. Stevens L.A., Greene T.D., Levey A.S. Surrogate end points for clinical trials of kidney disease progression / L.A. Stevens, T.D. Greene, A.S. Levey. - Clin J Am Soc Nephrol 2006; 1(4): P.874-884.

Kudrina Polina Ivanovna – candidate of medical science, junior research assistant of the Yakutsk scientific center of complex medical problems of the Siberian Branch of the Russian academy of medical sciences, neurologist of the Geriatric center of the Republican hospital №3, Yakutsk, Russia, e-mail: pkudrina@bk.ru.

Ar'ev Leonid Alexandrovich, MD, professor, SPb MAPO, Department of Gerontology and Geriatrics.