

might imagine there could be difficulties, but no difficulties arise. Most patients with ischaemic limbs with a degree of renal failure experience no problems. An hypothesis is that the joint itself contributes to urate production making it an environment where super saturation can occur if plasma levels are elevated. If such a mechanism existed, the most likely explanation would be that the enzyme, xanthineoxidase, was up regulated somehow within the synovial membrane.

Our understanding of this enzyme has changed dramatically in the past few years. Firstly, it is now known that the conversion of purines to uric acid is only one of the functions of this redox centres enzyme. There are two other redox centres in the enzyme, one site, which is known to reduce oxygen to superoxide and a other site - an iron sulphur centre whose function is less clear. Recent studies have shown that the enzyme can serially reduce nitrates to nitrites, nitrites to nitric oxide and nitric oxide reacts with superoxide very rapidly to produce peroxyxynitrite. Nitric oxide, superoxide and peroxyxynitrite are powerful anti-bacterial systems. This raises the question - does the joint have a powerful anti-bacterial system and is the development of gout a reflection of this process?

Our interest in this area was stimulated when we took note of the fact that the levels of xanthineoxidase were very high in breast milk of lactating mammals (Stevens C.R. et al., 2000). A series of studies have now clearly demonstrated that the function of this enzyme is antibacterial and its purpose to protect the neonatal stomach and perhaps the lactating breast.

Now we shall consider infective and reactive arthropathies. Isolating intact organisms from the joint of patients with a bacteriamia and septicaemia is very difficult and indeed, most bacteraemic and septicaemic illnesses are not associated with an infective arthritis. The synovial membrane - is a fragile structure with multiple vessels for the most part supported by fatty tissue, potentially easily traumatised and able to leak. This structure is necessary for the correct physiological function of the joint allowing cartilage, which is avascular, but metabolic active. It is therefore at risk, and the presence of an antibacterial system, especially for the joint, would minimise this.

The evidence is recently found that the synovial micro vessels have an enhanced capacity to generate reactive nitrogen species and preliminary evidence that isolated synovial endothelial cells have an enhanced capacity prepared with other micro vessels to produce xanthineoxidase. It allows to connect these observations, and suitable experiments to do conclusion. In this presentation, we use teleological centred arguments to develop this hypothesis utilizing examples from other species in the animal kingdom.

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### DEVELOPMENT FEATURES OF DISCIRCULATORY ENCEPHALOPATHY IN PERSONS SUBJECTED TO IONIZING RADIATION

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Epidemiological surveys showed that in accident consequences liquidators (ACL) in Chernobyl Nuclear Power Plant vascular damages of the central nervous system take one of leading places in disease incidence structure being the main reason of disability, social maladjustment and mortality.

The investigation purpose is to study the features of chronic brain ischemia in persons subjected to radiation effect.

#### Materials and methods

An examination of 536 men aged from 39 to 60 years old having taken part in Chernobyl disaster clean-up in the period from 1986 to 1988 (the first group) was carried out. 436 men with burdened radiation induced anamnesis made the control group (CG). Both groups were representative in age, physical comorbidity, intensity of encephalitic semiotics for April, 1986. The patients' state evaluation was carried out on one diagnostic algorithm taking into account physical and neurologic state, radiological anamnesis, laboratory-instrumental investigation methods including brain CT, MRT.

The statistical treatment of the material was carried out with the help of the Biostat program. The Student's criteria were used for pair values; the differences were considered to be authentic at  $p < 0,05$ .

#### Research results

For the accident moment there were no cerebrovascular insufficiency signs registered in the ACL, in 20 persons (4,2%) of the CG there was semiotics of initial signs of cerebrovascular insufficiency (ISCI) observed. A year after the emergency works the clinical picture of cerebral circulation insufficiency became apparent in 108 liquidators, that is 2,2 times as more than in the CG patients (49 persons). Among them the ISCI in the ACL made 9,9% (53 persons), in CG patients - 5,6% (27 persons); clinical implications of dicirculatory encephalopathy (DE) were detected in 10,2% of the ACL and 4,5% of the CG patients accordingly. In the ACL the organic manifestations of encephalitic pathology were represented by the I stage DE (8,9% of the cases) and the II stage DE (1,3% of the cases); in persons having been subjected to the radiation effect - only DE of the I stage (4,5%). For the following 3 years the DE was formed in 16,0% of the ACL: I stage DE - in 9,7% (52 persons), II stage DE - in 6,3% (34 persons); in every third liquidator (35,4%) the ISCI was registered. In patients without radiological anamnesis the DE was detected in 15,6% of the cases (75 persons): I stage DE - in 14,2%, II

stage DE – in 1,4%), and the ISCI increase for three years made in them 15,8%.

The five-year-postaccident-period was characterized by the ISCI predominance (2,8 times as much;  $p<0,01$ ) over the DE frequency both in the ACL (51,9% and 18,7% accordingly) and in the CG patients (ISCI – 37,9% of the cases; DE – 20,6% of the cases) with relatively stable state of cerebral hemodynamics. During the following 5 years (up to 1996) in the ACL the steady progredient course of chronic brain ischemia was registered. Clinical DE manifestations are detected in the majority (84,1%) of the liquidators (I

stage DE – in 41,8%, II stage DE – in 37,5%, III stage DE – in 4,8%). Relatively healthy, i.e. having no clinical manifestations of chronic brain ischemia, 5,2% of the ACL (28 persons) remained. Among “unirradiated” persons the DE development dynamics was less expressed. In this group the ISCI (42,5%) and I stage DE (36,6%) patients prevailed.

The key moment of the 100% DE development in the ACL is a 15-year period after the effect of small radiation doses (Table 1).

Table 1. Discircular encephalopathy development dynamics in the examined patients for the period of 15, 20 years after the accident

Diseases	1 group (ACL), n=536				2 group (control), n=480			
	2001		2006		2001		2006	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
ISCI	0	0	0	0		36,2	71	14,8
I stage DE	138	25,7	1	0,2	196	40,8	201	41,9
II stage DE	350	65,3	444	82,8	78	16,3	169	35,2
III stage DE	48	9,0	91	17,0	12	2,5	32	6,7
Total DE patients	536	100	536	100	286	59,6	402	83,8

By that time the clinical picture of cerebral discirculation in 65,3% of the cases (350 persons) had been in accord with II stage, in 25,7% of the cases (138 persons) – the I stage, in 9,0% of the cases (48 persons) – III stage. The DE development dynamics in the CG persons bore a more gradual, progressive character, making 59,6% (286 persons) with the prevalence of I and II DE stages (40,8% and 16,3% accordingly). The cerebral affection manifestations corresponding to III DE stage were registered only in 12 patients (2,5%), that is 4 times less than in the ACL ( $p<0,001$ ).

By 2006 (20 years after the accident) the diffuse ischemic cerebral affection clinical picture had been represented by II stage DE in 82,8% ACL, III stage DE – in 17,0%. In most of them there were cognitive disorders of various manifestation degree, which were combined with local neurologic syndromes (discoordinatory 88,6%, pyramidic 77,4%, psychoorganic 71,6%, progressive vegetative insufficiency 96,1%). The development of psychoorganic syndrome of different manifestation degree was registered in 76 participants of the emergency works (14,2%) by 1996, by 2006 their number grew 5,1 times as more (384 persons;  $p<0,001$ ). In persons of general population these factors were significantly lower – 0,4% and 4,6% accordingly ( $p<0,001$ ), that again confirms a more favourable type of the DE course in persons without radiation anamnesis. The increased brain epiactivity development has become specific for DE in persons with radiation anamnesis. In 1996 14 such patients (2,6%) were found out, by 2006 their number had increased up to 69 (12,9%;

$p<0,001$ ). In the CG patients there were no epileptic phenomena registered.

Among the examined second group patients by 2006 the DE had been registered in 83,8% of the persons, almost the half of the patients (41,9%; 201 persons) having I stage DE, 35,2% (169 persons) – II stage DE, that is 2,8 times less than in the ACL. III stage DE was detected in 32 patients (6,7%); 7 patients (1,5%) were relatively healthy, i.e. had no clinical signs of DE.

Thus, the results of 20-year long observation showed that in persons subjected to ionizing radiation the development of chronic cerebral ischemia is characterized by an early and more “malignant” type of course compared to the patients of general population, for whom a gradual onset rate and a less expressed brain affection are definitive.

#### Conclusions

1. Persons subjected to low-intensity ionizing radiation are referred to the high risk group of chronic cerebral ischemia development.

2. In liquidators of Chernobyl Nuclear Power Plant breakdown aftereffects the development of chronic cerebral ischemia is characterized by an early and more “malignant” type of course compared to the patients of general population.

3. The discirculatory encephalopathy course in accident consequences liquidators in Chernobyl Nuclear Power Plant bears gradual character: from stormy augmenting of cerebral affection symptoms during the first two years after the radiation, relative stability of the disease clinical implications in the following 5-6 years and then intensively – as a progressive diffuse

process of encephalitic failure with forwardness of vegetative dysfunction, psychoorganic syndrome and epilepsy.

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### **INFRINGEMENTS OF HOMEOSTASIS OF LIPID AT PATIENTS WITH CHRONIC PYELONEPHRITIS**

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Wide prevalence of chronic pyelonephritis, variability of current, the adverse forecast - all this causes necessity of early diagnostics and perfection of methods of treatment of this pathology. During recovery regress of clinical symptoms of disease outstrips normalization of metabolic infringements. Than more hardly and longly illness, backlog of metabolic remission from clinical is especially expressed. Among metabolic infringements which are one of the reasons of progressing chronic pyelonephritis, the role lipids and a condition of lipids peroxidation is widely discussed. Change of a functional condition antioxidant system and excessive activation of processes of lipids peroxidation creates the certain conditions for structural reorganization of lipids components of cellular membranes. Revealing probable variants of metabolic infringements is actual at chronic pyelonephritis, development pathogenesis the proved address methods of the regenerative therapy directed on metabolic correction.

The purpose of research – to study features of lipids homeostasis, processes of lipoperoxidation at patients with a chronic pyelonephritis in a phase of remission and a latent inflammation.

226 patients chronic pyelonephritis in a phase of remission (73,4 %) and in a phase of a latent inflammation (26,5 %) in the age of  $48,9 \pm 0,8$  years are surveyed. Among surveyed women (69,9 %) are prevailed. At 46,9 % secondary chronic pyelonephritis proceeded on a background nephrolytiasis. In research did not include patients with chronic renal failure and arteriosclerotic heart disease.

Research a spectrum of lipids of whey of blood and redistribution of structure phospholipids (PL) in red blood cells is lead. A condition of system of antioxidant protection (AOP) judged on an integrated parameter of antioxidant activity (AOA) of plasma of blood. An intensification of processes the lipids perox-

idations estimated in red blood cells on increase malonic dialdehyde (MDA).

The analysis of structure of serum lipids in 53 % of cases has revealed its infringement. Distribution on types according to classification of Frederickson has shown, that for patients chronic pyelonephritis characteristic is dislipidemia IIa type. Redistribution of structure of phospholipids of red blood cells and fat acids (PA) included in them is established. The orientation of changes is expressed by decrease in a share of phosphatidilholine (PH) and sphingomieline (SM), increase phosphatidiletanolamine (PE) and phosphatidilserine (PS). The estimation of a condition of system the lipids peroxidation - AOS at 67,6 % surveyed has shown oppression of processes of lipoperoxidation. At 11,9 % of patients processes the lipids peroxidation were at a physiological level. The condition of hyperoxidation, expressing in increased level of MDA in blood has been revealed in 22,6 % of cases. The high factor MDA/AOA has testified about insufficiency of system AOS. Such condition of system the lipids peroxidations - AOS creates conditions for an aggravation of disease.

With the help of methods of the multivariate statistical analysis (factorial, cluster) three are allocated most frequently meeting clinic-metabolic a variant of metabolic infringements distinguished by character.

The first variant is characteristic for patients chronic pyelonephritis in a phase of remission and a latent inflammation with duration of disease till 5 years, rare aggravations (no more than 1 time one year), in whey of blood reveal the increased level of cholesterol of very low density lipoprotein (VLDL), in red blood cells - shares PS, total contents  $\omega 3$ ,  $\omega 6$  FA, a high level of nonsaturation, oppression of processes peroxidation on a background of high activity AOS.

The second variant meets at patients with chronic pyelonephritis in a phase of a latent inflammation the anamnesis of disease of 8 years, frequency of aggravations up to 2 times one year, in whey – hypercholesterolemia the easy degree, increased level VLDL, cholesterol of low density lipoprotein (LDL), are broken viscously - elastic properties of a membrane or red blood cells, ratio PH/PE caused by change, level MDA and parameter AOA are reduced.

The third variant is observed at patients chronic pyelonephritis in a phase of remission and a latent inflammation with duration of illness more than 8 years, frequency of aggravations up to 3 times one year is characteristic easy hypercholesterolemia, increased level of VLDL, LDL, deep metabolic changes of components of lipids of a cellular membrane - disbalanced structure FL and included in them  $\omega 3$ ,  $\omega 6$  FA on a background of the debalanced processes the lipids peroxidations - AOS.

The received results have clinical value for forecasting current chronic pyelonephritis and a choice of adequate methods of secondary preventive main-