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EDITORIAL

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Journal *Archiv Euromedica* highlights researches on all aspects of medicine and particularly applied fundamental researches in medicine, latest developments and methods of treatment and prevention as well as new technologies in medical education and postgraduate education of medical professionals.

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REMODELING OF THE HEART, DEPENDING ON LENGTH OF SERVICE MANAGEMENT

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ABSTRACT — Structural and functional parameters of cardiovascular system of the civil servants sick with AH depending on seniority are studied. It was found that at the experience of work up to 11 years the hyperkinetic type of blood circulation is formed, and at the further increase in the seniority — hypokinetic type of blood circulation. Starting with the seniority of more than 5 years structural and functional changes of cardiovascular system gradually accrue, with development of hypertrophy of interventricular wall and with the pronounced increase in mass of a myocardium of left ventricle at seniority of more than 10 years. With the increase in the experience of work the adaptation capacity of cardiovascular system decreases.

KEYWORDS — structural and functional indicators of the cardiovascular system, arterial hypertension, civil servants

INTRODUCTION

Management activities associated with exposure associated complex of factors of production, the priority of which is the intense emotional and intellectual load irrational mode of work organization. Associated with increased psycho-emotional stress constant adrenergic mobilization of the central and peripheral parts of the cardiovascular system is disintegrating regulatory adaptive mechanisms and leads to exclusion and the development of various diseases, such as hypertension (AH) [1]. It is known that of left ventricular hypertrophy with AH is an independent risk factor for cardiovascular disease and death, as well as major preclinical was stolen of the cardiovascular system, which increases the risk of coronary heart disease and myocardial infarction, stroke, congestive heart failure, sudden death [3].

The purpose of research the study of cardiac remodeling in arterial hypertension in the management of employees, patients with hypertension, according to their seniority.

MATERIAL AND METHODS OF RESEARCH

The structural and functional parameters of the cardiovascular system (CVS) 84 administrative



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workers (52 men, 32 women) with hypertension aged 30–63 years (mean age $49,12 \pm 0,98$ years). The control group consisted of apparently healthy persons comparable to patients by age, not working in the field. Echocardiography was carried out on the unit «Tochiba-350» (Japan). The structural parameters were studied: end-systolic and end-diastolic volume and the size of the left ventricle (ESV, EDV, ESS, EDS) ejection fraction (EF), shock and minute volume (SV, MV), the thickness of the back wall of the left ventricle (Tbwl) and interventricular partitions (Tip), the size of the left atrium (LAS) and aorta (Ao), the degree of shortening of the diameter of the left ventricle in systole (ΔS). Mass index of left ventricular (ILVM) as the ratio of left ventricular mass (LVM) to body surface area [4]. Calculated in the following functional parameters CVS: medium dynamic pressure (MDP), and total peripheral vascular resistance (TPVR), stroke index (SI), cardiac index (CI). Statistical analysis of the results of studies carried out with the help of the program Statistica 6.0.

RESULTS

In the analysis of structural and functional cardiac parameters found that increasing the length of service has not led to significant changes in parameters such as the size of the aorta and the left atrium, ESS, EDV, ESV, EF, ΔS (Table 1). EDS of the left ventricle was significantly greater than the parameters of previous groups, starting with the experience of more than 10 years. So, EDS in the group 11–15 years was $4,92 \pm 0,06$ cm, which is 4.5% more than in the previous group ($p < 0.01$) and 8.9% more than in the control group ($p < 0.001$). EDS in a group of 16 or

more years is also 8.9% higher than the parameters in the control group and 4.0% above parameters experience group 5–10 years. According to research by Hermann M. et al. [5] with a length of 0–5, 6–10, 11–15 years, the development of hypertrophy of the walls of the left ventricle is no increase in myocardial mass, increase LVM is only after having worked for over 20 years. A.V.Sorokin et al. [2] increased rates of LVM, identified in individuals with normal blood pressure in

than in the group of 0–5 years. LVM and ILVM compared with previous experience begins to grow in groups of workers with experience of more than 10 years. Experience in groups 11–15 and over 15 years of LVM was $219,93 \pm 9,42$, and $245,69 \pm 8,19$ g, ILVM $114,60 \pm 4,52$ g/m² and $135,68 \pm 4,33$ g/m², respectively. TTW at the experience of 11–15 years and over 15 years has increased to $0,43 \pm 0,01$ and $0,44 \pm 0,01$. It should be noted, is an increase in LVM

Table 1. Echocardiographic parameters of the heart in the management of employees, patients with hypertension, according to the employment experience

Parameters	0–5 years (n=17)	6–10 years (n=30)	11–15 years (n=24)	≥ 16 years (n=13)	Control (n=18)
Ao, cm	2,99±0,09	3,01±0,06	3,23±0,09	3,17±0,18	3,02±0,05
LA, cm	3,41±0,12	3,27±0,08	3,32±0,09	3,49±0,11	3,29±0,08
EDS, cm	4,72±0,11	4,70±0,06	4,92±0,06 ^{ooo}	4,95±0,05*	4,51±0,06
ESS, cm	3,02±0,08	2,94±0,05	3,02±0,06	3,01±0,05	2,88±0,05
EDV, ml	123,16±2,88*	117,11±2,45**	115,44±2,76	111,93±4,59	109,11±2,02
ESV, ml	38,37±2,33	34,08±1,75	38,81±2,41	39,93±1,82	34,61±1,55
EF, %	68,95±1,66	69,00±1,29	68,20±1,61	63,69±2,05	68,38±1,14
ΔS, %	35,27±0,88	36,38±0,88	36,96±1,78	36,64±1,88	40,06±2,92
Tbwlv, cm	0,88±0,02	0,90±0,02	0,99±0,02 ^{oo}	1,05±0,03*	0,86±0,02
Tip, cm	0,92±0,02	0,97±0,02	1,10±0,03 ^o	1,14±0,02*	0,94±0,01
LVM, g	188,56±8,27	191,25±6,82***	219,93±9,42 ^{oo}	245,69±8,19*	168,98±6,46
ILVM, g/m ²	94,32±3,13	98,11±3,06**	114,60±4,52 ^{ooo}	135,68±4,33*	91,04±2,97
TTW	0,38±0,01	0,39±0,01	0,43±0,01 ^{oo}	0,44±0,01*	0,38±0,01

* – $p < 0,001$, ** – $p < 0,05$, *** – $p < 0,01$ compared with the control group;

^o – $p < 0,001$, ^{oo} – $p < 0,05$, ^{ooo} – $p < 0,01$ compared with the previous group

occupational stress associated with the neurotrophic effects of stress hormones.

According to our data remodeling processes begin to appear with the experience of more than 10 years and are characterized by a significant increase in left ventricular mass. The average values of the surveyed persons Tbwlv significantly increase with work experience of 11–15 years to $0,99 \pm 0,02$ cm, after having worked for 16 or more years to $1,05 \pm 0,03$ cm with increasing length of service increases gradually Tip and have worked for over 10 years exceed the allowable value. Tip in the group 11–15 years was $1,10 \pm 0,03$ cm, with a length of more than 15 years — $1,14 \pm 0,02$ cm According to Pickering TG [6] the presence psychomental factor at work is closely associated with the degree of target organ damage, in particular — with a thickness of the left ventricular myocardium. LVM and ILVM have workers with 6–10 years significantly exceeds the benchmark of 11.6% and 7.2% ($p < 0,01$, $p < 0,05$), but not higher

and TTW have examined patients is due to hypertrophy of the walls in the left ventricular cavity intact. In our study, changes in EF has been established. EF in a group of 0–5 years was $68,95 \pm 1,66\%$, 6–10 years — $69,00 \pm 1,29\%$, 11–15 years — $68,20 \pm 1,61\%$, over 15 years — $63,69 \pm 2,05\%$. With increasing experience of work has been a gradual, but not significant increase in the MDP (Table 2). Only with experience of 16 years and more MDP experience is significantly higher than ($P < 0,05$) rates in smaller groups experience.

Experience in groups 0–5, 6–10 years MDP is improved by increasing the cardiac output. Starting from the experience of 6–10 years in workers was significantly higher TPVR ($p < 0,001$) and reduced MV ($p < 0,01$) compared to the experience 0–5 years. In general, the experience of more than 10 years formed hypokinetic circulation with a significant increase in TPVR to $2009,35 \pm 65,88$ and $2275,61 \pm 126,65$ din.s.sm experience in groups 11–15 and over 15 years ($p < 0,001$). MV in the experience group 11–15 years

Table 2. Central hemodynamics in managerial employees, patients with hypertension, according to the working

Parameters	0–5 years (n=17)	6–10 years (n=30)	11–15 years (n=24)	≥ 16 years (n=13)	Control (n=18)
MDP, mm Hg	116,92±1,54*	120,35±1,35*	124,24±1,95*	131,82±2,58* ^{oo}	87,91±1,66
HR, beats in minutes	75,82±2,58**	69,43±1,52 ^o	68,87±2,11	68,07±3,03	66,94±1,18
MV, ml/min	6,35±0,16*	5,69±0,11* ^{ooo}	5,07±0,19 ^{oo}	4,79±0,26	4,98±0,14
CI, ml/min/m ²	3,21±0,09*	2,95±0,08**	2,68±0,14	2,66±0,16	2,70±0,08
SV, ml	84,78±2,58*	83,03±2,27***	73,74±2,06 ^{ooo}	72,00±4,79	74,50±1,59
SI, ml/m ²	43,12±2,04	43,00±1,43	39,07±1,82	39,96±2,91	40,38±1,03
TPVR, din.c.cm	1486,24±42,06	1703,39±32,32* ^o	2009,35±65,88* ^o	2275,61±126,65*	1419,33±32,14

* – p<0,001, ** – p<0,05; *** – p<0,01 compared with the control group;

^o – p<0,001, ^{oo} – p<0,05; ^{ooo} – p<0,01 compared with the previous group

was significantly reduced ($p < 0.05$) compared with the volume in the group 6–10 years and was comparable to the rate in the control group. Formation hypokinetic type of circulation in experience groups 11 or more years can be attributed to age-related changes in myocardial and peripheral vascular disease (age experience in these groups was significantly ($p < 0.05$) than the age of the control group and the experience of 0–5 years), and more severe vasoconstriction, coupled with the α -adrenergic activation and the weakening of β -adrenergic response in long-term psycho-emotional stress.

In addition, at later stages of adaptation to a decline AH activity of the sympathetic nervous system in response to an increase in blood pressure. [3] The average age of employees with managerial experience of 0–5 years was $36,47 \pm 1,18$ years, with experience 6–10 years — $47,28 \pm 3,38$ years, with experience 11–15 years — $51,26 \pm 1,49$, with the experience of 16 or more years — $53,28 \pm 1,44$ years.

CONCLUSIONS

Thus, the development of hypertension in the management of employees whose work is concerned with the impact of increased psycho-emotional stress, is characterized by the formation of the type of hyperkinetic circulation in experience and 11 years, with a further increase in the experience of work — hypokinetic type of circulation. Starting from the experience of more than 5 years, gradually increase the structural and functional changes in the CVS, with the development of left ventricular hypertrophy with marked increase in left ventricular mass with experience of more than 10 years.

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EVALUATION OF MICROVASCULATURE TISSUES VIABILITY AFTER THE IMPOSITION OF REMOVABLE ORTHODONTIC APPLIANCES IN CHILDREN AND ADOLESCENTS

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TOPICALITY

One of the important problems in modern pediatric dentistry is the study of adaptive reactions of children and adolescents dentition when using removable orthodontic appliances [12].

Oral tissues adaptive capacity can be described by the following parameters: value of the capillary blood flow at the level of attached gingiva, secretion rate, and chemical composition and properties of saliva, which change dynamically in the course of orthodontic treatment [2,3]. The scores of the indicators mentioned depend on the initial state of prosthetic bed tissues, qualities of construction materials used for the manufacture of orthodontic appliances, microbial species composition, as well as the severity of microbial colonization and antigen stimulation [4,6].

It is a proven fact that with all the modern construction materials, production technologies, and improved orthodontic appliances available the appropriate assessment of dentition adaptive reactions is possible only on condition that up-to-date biochemical, immunological and functional analyses are used [7,10]. For instance, the research data available suggest that the restorative materials used to manufacture orthodontic equipment do not have an impact just on the quantity of the oral liquid (the amount and rate of secretion), yet on its quality as well (pH, the buffer systems ratio, the content of the macro- and microelements, and the indicators of biochemical & immunological activity) [5].

Currently a considerable interest is focused on the functional studies, allowing getting quantitative data concerning linear and volumetric parameters of the microvasculature structure, and the intensity of hemodynamics in prosthetic bed tissues while using removable orthodontic appliances [1,8]. The research data were published on the gingival tissues microhemodynamics after application of removable orthodontic appliances in adult patients [9,13].

However, studies of microcirculatory perfusion parameters that allow assessing the recovery period of

capillary blood flow in the gingival tissues beneath the orthodontic appliances' base materials in the pediatric population, are few and systematized. Virtually no comparative data are available on the adaptation time for orthodontic appliances made of different types of base materials in children and adolescents.

The integrated assessment of gingival tissues microhemodynamics with laser Doppler flowmetry (LDF) will help to analyze tissue microvasculature viability after application of orthodontic appliances and provide significant data for pediatric dentistry [11,15].

Individualized and evidence-based selection of the plastic base for orthodontic appliances will contribute to the accelerated adaptation as well as optimized vascularization in prosthetic bed tissues providing long-term efficacy of therapeutic measures.

THE AIM

To improve efficiency of orthodontic treatment when using removable orthodontic appliances in children and adolescents on the basis of integrated assessment of gingival tissues microhemodynamics with laser Doppler flowmetry.

MATERIALS AND METHODS OF RESEARCHING

Three types of base materials used for the manufacture of orthodontic appliances (according to the current international classification ISO 1567:1999 (Dentistry – Materials for denture)), were under consideration [14]. As for the type 1, fast cold-cured plastic based on polymethylmethacrylate (PMMA) Vertex

self curing (Vertex, Holland), was studied, which is a copolymer based on acrylic resins. The powder was a fine suspension of PMMA containing initiator – benzoyl peroxide, and activator – disulfanil; the liquid was a methyl ester of methacrylic acid containing activator – dimetilparatoluidin. Orthodontic appliances were produced by method of gypsum based hydropolymerization in Ivomat IP3 (Ivoclar–Vivadent). As to the second type, hot polymerization plastic based on PMMA ProBase Hot (Ivoclar–Vivadent, Liechtenstein) was studied, which belongs to the group of graft copolymers based on acrylic resins. The powder was a fine suspension graft copolymer of methyl methacrylate acid; the liquid was a methyl ester of methacrylic acid, containing diphenylolpropane dimethacrylic ester as a cross-linking agent. Orthodontic appliances were produced by method of compression molding in water polymerizer Acrydig 4 (F. Manfred). As for the third type, the base material Triad Denture Base (Dentsply, USA) was studied, which is a cross-linked acrylic resin structured as interpenetrating polymer network not containing PMMA. Orthodontic appliances were made using the technology of gypsum based light cure in Triad 2000 VLC Unit (Dentsply). All the materials were polymerized in accordance with the cycle parameters specified by the manufacturer. After removal of the plaster, each orthodontic device was machined and polished at first with a muslin polishing wheel using pumice and water, and then with polishing paste to the glossy shine. All constructions were placed in distilled water for 50 hours at 37° C.

The study of gingival tissues microhemodynamics was held in 60 children and adolescents with satisfactory and good indices of oral hygiene. Patients were divided into the control group and two dispensary supervision groups. The control group consisted of 20 patients with orthognatic bite without defects of dentition, who were under routine supervision. The first group included 20 patients with malocclusion without defects of dentition, who were provided with 26 orthodontic appliances (8 units made of base plastic of the first type, 9 units made of base plastic of the second type, and 9 units made of the type 3 materials). The second group consisted of 20 patients with malocclusion and dentition defects due to the premature loss of teeth, who were provided with 29 orthodontic appliances (8 units made of base plastic of the first type, 10 units made of base plastic of the second type, and 11 units made of base plastic of the third type). The appliances studied had been in constant use for 3 months. All respondents were trained in standard methods of cleaning teeth, adapted to their age and the rules of care for orthodontic appliances. Hygiene skills monitoring was held in children aged 7–11 years by means

of hygiene index (Fedorov-Volodkina, 1972), 12–16 years old – a simplified hygiene index OHI-S (Green J.C., Vermillion J.K., 1969; Kuzmina E.M., 2001).

LDF was performed using the laser analyzer of capillary blood flow (LAKK-02; version 2 – with two radiators at the wavelength 0.8 micrometers) with a quartz fiber optic probe, 3 mm in diameter and 1.8 m longwise (LAZMA, Moscow). The study of the gingival tissues microcirculation was carried out in a sedentary position in a dental chair. Sensor was set at level of the attached gingiva (AG) in the area of prosthetic bed tissues, and also in the projection of a toothless area of the alveolar process, ensuring perfect conformity of the probe's distal part to the gingival surface.

The data received on microcirculation index (MI) were represented in perfusion units (PU), prior to the application of orthodontic appliances made of different base plastics and after that – in 7 days, 1 month and 3 months.

The research data available allow to state that normal MI in adults ranges from 18.3 ± 0.19 to 21.2 ± 0.14 PU (20.0 ± 0.15 PU on the average). No data on the normal MI in children and adolescents were published.

The integrated assessment of microhemodynamics in different areas of the alveolar process (with or without the defect) helped us to work up a microcirculation indices' difference gradient (Gr), which was calculated as the ratio of the difference in microcirculation indices in the area of the defect and the intact area and their sum:

$$\text{Gr} = \frac{\text{MI}_{\max} - \text{MI}_{\min}}{\text{MI}_{\max} + \text{MI}_{\min}}$$

Dopplerograms processing was carried out using specialized software to the apparatus LAKK-02 (LAZMA) – software package LDF 2.20.0.507WL. T-test (t) was used to assess the reliability of numeric differences.

RESULTS AND DISCUSSION

The results of these experimental and clinical studies suggest that MI variability in the control group, as well as in the patients from the first group prior to the application of orthodontic appliances ranges from 13.06 ± 0.71 to 13.85 ± 0.83 PU. Midrange value of 13.44 ± 0.78 PU was conditionally taken for the norm as it corresponds to the state of perfusion in healthy tissues.

Microcirculatory perfusion parameters in prosthetic bed tissues in children and adolescents with malocclusion without defects of dentition while using removable orthodontic appliances made of 3 types of base plastics – Vertex self curing, ProBase Hot and Triad Denture Base – are represented in Table 1.

Table 1. Microcirculatory perfusion in prosthetic bed tissues in children and adolescents with malocclusion without defects of dentition while using removable orthodontic appliances made of 3 types of base plastics (PU)

Terms of supervision	Base plastic			P
	Vertex self curing	Pro Base Hot	Triad DentureBase	
Prior to the orthodontic treatment (normal state)	13.44 ± 0.78	13.44 ± 0.78	13.44 ± 0.78	>0.05
In 7 days from the treatment start date	18.37 ± 0.33**	17.16 ± 0.57*	16.22 ± 0.52*	<0.01
In a month from the treatment start date	17.65 ± 0.91	16.13 ± 0.86	15.38 ± 0.78	>0.05
In 3 months from the treatment start date	15.81 ± 0.28**	14.87 ± 0.43*	13.76 ± 0.81*	<0.01

P – differences between the 3 types of base plastics;

* – differences' significance in comparison with the normal figures <0.05;

** – differences' significance in comparison with the normal figures <0.01

The quantitative analysis of prosthetic bed tissues microhemodynamics in patients from the first group (in 3 months from the treatment start date) suggests that the highest perfusion rates can be observed in patients provided with fast cold-cured plastic based appliances, while the optimal MI (correspondent to that of the healthy tissues) seems to be associated with the light-cured base plastics.

Microcirculatory perfusion parameters in the defect area in children and adolescents with malocclusion and defects of dentition while using removable orthodontic appliances made of 3 types of base plastics – Vertex self curing, ProBase Hot and Triad Denture Base – are represented in Table 2.

The quantitative MI-analysis of prosthetic bed tissues in patients from the second group suggests that the light-cured base plastics orthodontic appliances cause significantly increased perfusion in the defect area during the first week of treatment. Soon after that the perfusion rate starts to decrease gradually, and in a month comes to a level close to the normal, although the indices are significantly higher than those prior to the imposition of the orthodontic appliances. This can be confirmed by the orthodontic appliances congruence with prosthetic bed which is due to the qualities of the materials used and the technological methods of manufacture.

In a week from the treatment start more significant increase of perfusion in the defect area can be

Table 2. Microcirculatory perfusion in the defect area in children and adolescents with malocclusion and defects of dentition while using removable orthodontic appliances (PU)

Terms of supervision	Base plastic			P
	Vertex self curing	Pro Base Hot	Triad Denture Base	
Prior to the orthodontic treatment	7.67 ± 0.32**	7.67 ± 0.32**	7.67 ± 0.32**	<0.01
In 7 days from the treatment start date	17.12 ± 0.31**	16.45 ± 0.73*	15.57 ± 0.62*	<0.01
In a month from the treatment start date	11.89 ± 0.58	12.58 ± 0.24	14.68 ± 0.83	>0.05
In 3 months from the treatment start date	8.27 ± 0.23**	9.78 ± 0.42*	11.14 ± 0.29*	<0.01

P – differences between the 3 types of base plastics;

* – differences' significance in comparison with the normal figures <0.05;

** – differences' significance in comparison with the normal figures <0.01.

The results of experimental and clinical studies showed that the MI in the cases of dentition defects in the area of AG was significantly lower than the norm (7.67 ± 0.32 PU). MI lowering in premature loss of teeth indicates a decrease in tissue perfusion in the area with the defect of dentition, and locally affected blood supply. This is an indication for prosthetic treatment aimed to improve blood circulation in the area.

observed when using appliances made of hot and cold polymerization plastics based on PMMA, than made of light-cured plastics.

In a month microhemodynamics in the defect area is sharply reduced because of the excessive pressure of prostheses and compensatory mechanisms disorder as a result of prolonged adaptation to excessive stress. In 3 months MI in the defect area exceeds the

original values, which indicates the partial improvement of hemodynamics.

Microcirculation indices' difference gradient (Gr) in children and adolescents with malocclusion in the areas with dentition defects, and without defects, after imposition of orthodontic appliances made of 3 types of base plastics – Vertex self curing, ProBase Hot and Triad Denture Base – are represented in Table 3.

FINDINGS

1. The method of laser Doppler flowmetry can be proposed for the appropriate assessment of microhemodynamics perfusion parameters in prosthetic bed tissues in children and adolescents, corresponding to different phases of orthodontic treatment.

2. The integrated assessment of gingival tissues microhemodynamics with laser Doppler flowmetry (LDF)

Table 3. Microcirculation indices' difference gradient in children and adolescents with malocclusion in the areas with dentition defects, and without defects, after imposition of orthodontic appliances (PU)

Terms of supervision	Base plastic			P
	Vertex self curing	Pro Base Hot	Triad Denture Base	
Prior to the orthodontic treatment	0.28 ± 0.03	0.28 ± 0.03	0.28 ± 0.03	
In 7 days from the treatment start date	$0.15 \pm 0.027^{**}$	$0.12 \pm 0.023^{**}$	$0.09 \pm 0.003^{**}$	<0.01
In a month from the treatment start date	$0.03 \pm 0.019^{**}$	$0.02 \pm 0.017^{**}$	$0.06 \pm 0.002^{**}$	<0.01
In 3 months from the treatment start date	$0.19 \pm 0.031^{**}$	$0.13 \pm 0.024^{**}$	$0.02 \pm 0.002^{**}$	<0.01

P – differences between the 3 types of base plastics;

** – differences' significance in comparison with the rate prior to the orthodontic treatment

Microcirculation indices gradient shows a significant difference between healthy tissues and the defect area bloodstreams. Application of removable orthodontic appliances of any type causes immediate and significant decrease of Gr in the defect area, as well as in the intact gingiva (up to 0.09–0.15 PU), indicating a pronounced increase in the microcirculation flow in the defect area. Moreover, while using the appliances made of hot and cold curing basic plastics, Gr reduces significantly within a month after treatment start which indicates an improved blood supply to the defect area.

However, after 3 months of treatment Gr increases dramatically (up to 0.13–0.19 PU), which indicates tissue perfusion changes because of the prolonged use of the appliances, and its obvious deterioration in the area of defect. Gr rates were found to be 1.47–2.15 times lower than those prior to the orthodontic treatment.

Light cured base plastics caused gradual reduction of the Gr (0.09; 0.06 PU), and the values tended to approach 'zero' level (0.02 PU). This indicates that tissue perfusion in the dentition defect area after orthodontic treatment practically corresponds to the parameters of healthy gingivae.

suggests that the prostheses made of light cured base materials promote improvement of vascularization, trophics and perfusion in prosthetic bed tissues compared with prostheses made of cold and hot cured base plastics.

3. When using removable orthodontic appliances, adaptation time shortening depends on the degree of appliance's congruence with prosthetic bed, the chemical class of the base material, and the type of polymerization (cold, hot, light).

4. Clinical evaluation of the available methods of orthodontic treatment, orthodontic appliances design improvement, alongside with the implementation of modern restorative materials and manufacturing technologies, as well as the improved biochemical, immunological and functional analyses will contribute to the perfected orthodontic care in children and adolescents.

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CONTEMPORARY STATE OF DOLPHIN THERAPY

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ABSTRACT — There is a survey of the literary and our own information concerning dolphin therapy in pediatric psychiatry and neurology. As a new method of rehabilitation to the contemporary children psychiatrists, dolphin therapy draws more and more attention rather of the parents of the sick children than the experts in this field. Owing to their persistence it has taken its considerable place among the auxiliary methods supplementing the complex therapy of infantile autism, psycho-organic disturbances, the backlogs of psycho-speech development, mental retardation and the other states. The authors voicing some doubts in validity of the therapeutic action of this method are not acquainted with the corresponding Russian literature. In process of the further humanization of psychiatry dolphin therapy will occupy a proper place among the ways of psycho-sensory integration of the developing brain as one of methods of animal therapy.

KEYWORDS — dolphin therapy, autism, mental retardation

Among the methods of animal therapy dolphin therapy is the second widespread method of rehabilitation of the patients of different age after hippotherapy (horse therapy). The attitude to it concerning the doctors and the parents of sick children fluctuates from «beliefs in a miracle» to the reproaches in the validity absence of its efficiency. The present article is an attempt to present an objective picture of the place of dolphin therapy in the rehabilitation process.

In 1960s the edition of the book of the American biologist John Lilli «People and Dolphins» has drawn attention of the world community. He proved that dolphins are our brothers as for intellect, even tried to teach them English. This book has generated a special tendency among some defenders of the wildlife nearly idolizing dolphins. But also it provided an opportunity to replace the utilitarian-pragmatic relation to these amazing animals promptly disappearing in the environment, with more careful one. Only in the Black Sea region (Bulgaria, Romania, Ukraine, Russia, Turkey) during the 20th century 5,5 million individuals of dolphins have been destroyed, basically for the cattle forage and for food (A.Berkin, S.Krivohazhin, 2007). Then the United Nations approved a convention, calling to put a ban for hunting of dolphins. Nevertheless in Turkey 20 years more they have been killed, and in

Japan and on Fiji Islands they kill them till now. Unfortunately, the indirect negative influence of the man on populations of dolphins proceeds: spreading of the fishing networks dangerous to dolphins; a destruction of a forage reserve at the expense of the excessive catch of fish; environment deterioration, including degradation of the ground biocoenosis. If these processes go with the same speed thus to the end of the century the dolphins will be necessary to bred in the artificial reservoirs.

The thought concerning the fact that communication with dolphins can have a medical effect, was also stated by Lille for the first time. It has had development and an attempt of a scientific substantiation in D. Natanson's works. In his works (Nathanson, D., 1980; 1989) he cited the examples with eight boys, suffering from some retardation of psycho-speech development as a result of the organic brain affection and oligophrenia. All the patients displayed speech accuracy considerably improved, especially the child with Down's syndrome. These first scientific investigations have generated a considerable number of imitations in different dolphinariums of the world.

Owing to the confluence of some factors Ukraine is a leader in the quantity of dolphinariums and their building abroad. The international recognition of this fact takes place. In 2008 in Odessa the international interdisciplinary congress «Sea Mammal of Golartika» was held. The leading experts of Ukraine, Russia, Canada, the USA, Japan, Finland, Denmark and other countries took part in it. The visit of the Odessa «Nemo», dolphinarium, the reports of L.N.Lukina (Sevastopol), A.P. Chuprikov (Kiev) devoted to dolphin therapy, have got the understanding and approval of the participants of the congress (B.Zhurid, 2008). At the annual meeting of the International academy of ecology (2011) in Kiev the report concerning the activity of dolphinariums of Ukraine has been approved.

In our country the priority in the field of using the therapeutic possibilities of dolphins belongs to the pediatricist, the Doctor of Medicine, professor L.N.Lukina who during the last 30 years has been conducted research work in the State oceanarium of the Ministry of Defence in Sevastopol where earlier the dolphins were trained for the participation in military operations.

The efficiency of dolphin therapy in many things was caused by the unique abilities of dolphins. They have developed the cognitive abilities and inquisitiveness. They possess a high degree of socialization that is

shown in a distinct zoo-hierarchy in the flock, allocation of the functions at the protection against sharks and hunting for fish. They concern the representatives of other kinds friendly, play with turtles, with other animals, and with the man.

The explanation of the benevolent relation of the dolphins to the person of A.J. Supin is known. The person is similar neither to any natural enemies of dolphins, or the object of hunting. That thing the person breathes air, the animals can define without the effort. From the point of view of a dolphin in water any person looks clumsy and helpless, as the sick relative who need to be supported: to push and keep him afloat. There was enough rare occurrences of rendering the assistance to the person so that the rumours concerning it widely spread all over the world, developing into the legends and myths.

In their communication the dolphins use various kinds of the sounds reminding squealling, crashing, trilling, clicking, clapping, and sometimes a roar, groaning and a howl. The sounds uttered by them, cover the unusually wide spectrum of frequency characteristics — from infrasonic to sound and ultrasonic ones. Their signals can be pulse and continuous. It is considered that for orientation the dolphins use lower and long (some milliseconds) signals, and for recognition — the signals of higher frequency. The pulse signals accompany echolocation. The skull and the soft tissues of the head concentrate sound fluctuations and play a part of some acoustic projector and a sound lens.

Though the brain of a dolphin is bigger than a human one, but the correlation of its weight to the weight of the dolphin's body is a bit less than such indicator observed at the person. The cortex has the more primitive structure, than the person's one - it has less layers of cells. The intellect of a dolphin has arisen in the water three-dimensional environment where the main meaningful image for it is a sound image, therefore the dolphin's brain is an ideal system, first of all for the reproduction and sound processing. They have sight developed worse. The ability to difficult behaviour and stability of the HNA are combined at dolphins with considerable inertness (Dandurants O., 2010).

It is considered that the dolphin's ability in pointed radiating the ultrasonic waves by its echolocator is an important component in medical value of dolphin therapy.

In the countries washed by the warm seas, the courses of sea bathing with the wild or tamed dolphins that come close to the shores from the high seas are popular. However the interaction with a dolphin in these cases is hardly operated and reminds thalassotherapy more, i.e. bathing in sea water.

In our country, in Crimea there are the dolphinariums working in a warm season where the animals are kept in the fenced part of the gulf. But they function strictly depending on the season and not for a long time. Besides, coastal sea waters both are essentially freshened, and dirtied by dumps of the industrial and household waste, therefore they are dangerous for the health of the dolphins. Keeping the dolphins in artificially organized environment (special pools), on the one hand, is rather costly production (a construction of a pool with a great volume of water, with power consumption and powerful filters, the acquisition of expensive fish etc.), on the other hand — it makes it possible to carry out dolphin therapy day and night, complying with standard conditions.

Dolphinariums in Ukraine usually carry out a commercial activity and receive incomes at the expense of the dramatized representations in which except dolphins fur seals, sea elephants, white whales participate. Dolphin therapy does not bring notable incomes, and sometime it is carried out at a loss to the owners, therefore its existence is an act of comprehension of the social responsibility and certain charity in relation to the children with special needs.

The maintenance of the dolphins makes the big demands to pool volume, a water chemical compound, its regular clarification, the high quality of sea fish which they eat, to a temperature mode. Such requirements should meet veterinary and ecological standards. Not less often than once a month each animal is surveyed by the veterinary surgeon.

All the employees of a dolphinarium having both a direct or indirect relation to dolphin therapy, should have medical books and pass corresponding medical examination in the target dates.

In dolphin therapy, the trainer of the animals having experience in social adaptation of animals usually participates in their education and training. The medical psychologist possessing knowledge in child psychology and pathopsychology, as a rule, is well acquainted in the behaviour of sea animals, and is able to supervise over them. The general control of dolphin therapy is carried out by the doctor having a specialization in the area of rehabilitology or medical psychology.

The trainer together with the veterinary surgeon determinate a state of the dolphin and its readiness for the carrying out the session of the dolphin therapy. In case of the prevalence of the motives in behaviour of the dolphin interfering its communication with children, for example, the aggressive behaviour, or sexual behaviour during the rut period; the animal is temporarily discharged of carrying out of the therapy sessions.

The main forms of interaction of a dolphin with the person in the dolphinarium in general can be described as follows.

1. **Controlled interaction.** The trainer directs a preliminary trained dolphin to the interaction with the patient by means of the corresponding stimuli, reinforcements and gestures. The fodder refreshment is the main motivational stimulus in establishing of the communicational relation a dolphin - a person and the maintenance of unconditioned reflexes by the methods of reinforcements and gestures.
2. **Active interaction.** One can find it less often and it looks like that: the dolphin shows the initiative to the interaction with the patient in the absence of stimulus and reinforcements. In this case the patient or the parents of the small patient can make the relations with a dolphin.
3. **The mixed type of interaction.** It can be met often. It looks as follows: It is enough to have small dose of food, the man's tender stroking and the dolphin hastens to execute and exceed a task in view. They treat the children with tenderness and keenness and in general not like adults; they are more interested in women than in men. Dolphins are very attentive to pregnant women. Occasionally dolphins show the aversion of separate individuals and float with them with an obvious reluctance i.e. in the operated interaction the dolphin introduces its attitude to the concrete person.

To provide a productive contact of the dolphin with the child appeared to be a problem of the medical psychologist. Work experience of the Centre of dolphin therapy «Nemo» shows that the medical psychologist in this case should use the methods of behavioural, game, corporally focused and art therapies. The psychologist can stimulate the displays of adaptive behaviour of the child in and outside the pool, fix and encourage the constructive models of behaviour. Individually selected complex of exercises is usually directed to the development of motor, sensory and informative spheres of the child. Exercises are offered in the game form and carried out together with a dolphin that actively joins in their performance. The majority of children with physical and mental problems have violent notions about their own body and sensations of space. The water part of the session including a tactile contact with a dolphin during swimming and the fulfilment of the certain motor problems, promotes more complete comprehension of his body by the child, an orientation improvement in space and sensorimotor correction (according to Chuprikov A.P., Vasilevskaia N.J. and co-authors 2008).

When the talk turns to the validity of the therapeutic effect of dolphin therapy, thus as a rule, one quotes T.-L. Khamphris (2003) or F.Breiks and K. Uiliamson (2007) who doubt its medical utility. It is necessary to consider that some publications proceed from the «defenders of dolphins» who heatedly demand «to set the dolphins free from prisons» that are artificial pools. Other authors, trying to generalize the publications about dolphin therapy with some criticism, are not acquainted with domestic works in this direction and, first of all, with L.N. Lukina's monography (2007) and her thesis for the doctor's degree (1994), who was the chief of the laboratory of the medical and rehabilitation dolphin therapy of the State oceanarium in Sevastopol. The clinical researches conducted by her involving 2500 patients of the different age, suffering from psychological disorders. Almost 315 healthy people were under control too. They used like the patients, thalassotherapy (bathings in sea water). Except the fixation of the clinical (including clinically-psychopathological ones) data, the patients were observed with the means of the psychophysiological techniques and psychological tests. The groups of the surveyed people consisted of the persons with a syndrome of chronic weariness (80 people), the children with neurotic disturbances (530 people), the children with autism (173 people), children and teenagers from the areas of ecological disaster (357 people), children suffering from the consequences of the cerebral spastic infantile paralysis (135 people) and the other groups. It is possible to tell that according to the volume of the clinically-laboratory researches, the received data and conclusion persuasiveness of the L.N. Lukina's work and her employees are unique and, discussing dolphin therapy, we seem, they should not be neglected.

In Evpatoria dolphinarium, which since 1999 appeared to be a base of the Ukrainian of Research institute of science of children balneology and physiotherapy, the works under the program confirmed by Ministry of Health of Ukraine are carried out; 256 children have been treated. The obvious improvement in the state of health is registered at 17% of children; an appreciable improvement of the state of health is noted more than at 80%; the quantity of children who were not observed to display any effect, has made only 2% (Fedorov A.F., Zhbanov A.V., Kozunova R. O, 2010).

In dolphinariums «Nemo» as for the reports of trainers and psychologists the improvement of different degree fluctuates from 75 to 82%. However, as a result of processing by the method of the content-analysis of the journals supervisions over the children during and after the sessions of dolphin therapy which

were conducted not by the employees of the dolphinarium, but the children's parents. The share of positive effects has decreased by 12–14% that, in our opinion, reflected psychology of the parents and their high expectations from the conducted therapy. Parents noted that the communication improvement was peculiar to 60% of children. Thus almost a third of the children were observed by the parents to have an occurrence of new sounds, syllables, words and word combinations. The child starts to initiate a contact with the other children, shows a desire to play with them. The understanding of the directed speech also improves. Many children slept at night better, and some began to fall asleep for the first time in the afternoon.

G.V. Manzhosova (2008) at the Institute of the man's brain of the Russian Academy of Sciences has carried out a psycho-physiological investigation of children after swimming with dolphins. It has appeared that 54% of children had an attention improvement to be noted, 52% — an uneasiness decrease, almost everyone shown an increase of the level of the corporal comfort. During a session excitation fell down, children calmed down.

As the experts of different dolphinariums got the results close in the psycho-pathological content in treatment of the different clinical states so, they have been generalized in the information letter of the Ministry of Health of Ukraine «Dolphin therapy in child psychiatry» (2009).

Infantile autism. Owing to that the most widespread standards of treatment often yield insignificant results at this disorder, bathing with dolphins is quite popular among the parents of sick children, and first of all owing to the evidence of positive shifts in the child's behavior in the end of treatment course. On the first lessons one can often notice the protest forms of behavior both on a scaffold, and out of it. In most cases they come to the end till the third-fourth visiting and the child is actively involved in a game and swimming with a dolphin. It was noticed that a rough protest reactions (shouts, crying, escape) correlate with the advancements in development of speech activity, up to the occurrence of some new words or offers. The most surprising for parents is occurrence so-called «eye contact» when the child, earlier avoiding to look in the face, ceases to avoid it, looks in the face surrounding with an open sight. It means essential positive shift in communications with an external world, possibilities of perception of the various information from which the child has been fenced off by an aversion wall. As a rule, children become quieter, more friendly, at them nonverbal communications improve, at them appetite improves, they start to sleep for the first time in the

afternoon and is deeper, and sleep at night longer. In some cases the positive effect appears only the treatment second year.

A contra-indication appeared to be a complication of infantile autism by disintegrative mental disturbances with odd, uneven behaviour.

Dolphin therapy can be carried out on the background of the pharmacological treatment earlier selected; it can be combined with the pneumomassage, game psychotherapy.

Syndrome of hyperactivity. The given disorder is rather widespread among the children with the signs of the so-called minimum brain dysfunction which origin has pre- and perinatal roots with a certain dose of the hereditary factor. They are easier involved in a game with dolphins, concern the water immersion more easy as well. Such children become quieter; impulsiveness falls or disappears, the movements become more conscious and dedicated. For the first time such children are observed to have assiduity and concentration elements.

Mental retardation. Children with mental retardation of different origin (organic, chromosomal, mixed genesis) are involved in dolphin therapy rather easily. Under its influence ingenuity considerably improves, their ability to socialization increases as well. Probably, this way it is possible to explain an influx of parents with children, suffering from Down's syndrome in dolphinariums. The children with apathy, exhaustion and asthenia prevalence in behaviour become more lively, vigorous and more active. The children with some erectile dysfunction and excessive mobility become quieter, and their behaviour — is more ordered. The children with a light degree of mental retardation show great successes, than the children with deeper forms of mental retardation.

Neuroses. Among the neurotized children taking treatment of dolphin therapy, show the uneasiness and aggression decrease; fears, and also the day and night enuresis disappear. The children having logoneurosis were noted to show some improvement of the speech motility, especially when besides dolphin therapy, the lessons with the logopedist were conducted. The children and teenagers with subdepressive symptoms were observed to have an improvement of indicators of projective tests-drawings; the choice of colour shifted the accent to the bright and cheerful ones. Phobias, first of all of the reactive origin, either decreased, or disappeared absolutely.

Cerebral spastic infantile paralysis and other statokinetic disorders. Considerable experience of the

dolphin therapy application at the given disorder has been generalized in A.G.Smolianinov's publications (2009, 2011). More often he prefers to involve the participation of the child in groups (that, by the way, reduces the cost of the lessons). Together with A. Vanchova (Slovakia) he considers that a participation in dolphin therapy sessions of the group of children and also their parents at the same time creates many stimuli of informative, communicative, emotional and social character. It influences the results of training, intellectual development and the socialization of the child. According to supervision of biologist S. Gontar, the dolphin works the better, than more children are in a circle of its game. The presence of the parents at this creates an original «safety zone» and psychological comfort for the child with motility disorders. During a session of dolphin therapy such children with motility disturbances carry out the tasks and exercises of kinesiotherapy. It leads to the balancing of the muscular tone (especially at the hyperkinetic form) that is expressed in the form of the movement changes peculiar to the child towards an accuracy improvement, and also an expansion of the range of the performed actions; speech improves at the same time.

A contraindication for the dolphin therapy appeared to be epilepsy or epileptiform states the child has. It is connected not only with some danger of bathing in water for such children, but also with that dolphin therapy as the psycho-stimulating factor, is capable to strengthen convulsive readiness and to provoke attacks from time to time. It is only possible to hail that in some dolphinariums the children are permitted to swim with dolphins if there are the results of electroencephalography.

The price of the course of dolphin therapy sessions is rather high and many families are unable to pay it. Though, by the way, in the USA, the price is higher in 10–15 times and consequently it is also not accessible to all the Americans. The exit from this situation can be only one – the society should pay for bathing of the children-invalids. As an example of that we can consider Moscow where it has been carried out by the mayor for many years. In Donetsk some part of cost for bathing is incurred by welfare funds. Dolphinariums «Nemo» (Kiev–Kharkov–Odessa–Donetsk) practise 20% reduction of price from November till April. Also, by the way, in Odessa only for one year it has been distributed about 10000 free tickets among the children from orphanhoods and pupils. As well as in dolphinariums the children visit so-called terrariums where various reptiles, fish of the southern seas and a collection of insects are contained.

About advertising of dolphin therapy. In the Internet there are different announcements of miracle

consequences of bathing with dolphins — up to the recovery from autism and cancer. In our opinion, it is an example of the unfair advertising which can not be provided by those collectives that really value their authority. Here it is necessary to tell that separate statements in mass-media concerning the requirements for the interdiction of the keeping the dolphins in the artificial pools and bathing the sick children in them, i.e. an anti-advertising, lead to the opposite effect: the popularity of this kind of rehabilitation grows, and a waiting list of the people who want to get to the dolphinarium becomes longer. Besides, among the defenders of the nature there is no the complete unanimity concerning this question. Recently it was reported that the ambassador of one of the largest European zoo-protective organizations — ETN his royal highness princess Maya von Gogenzollern (Germany), sponsoring the program for the children suffering from oncological disease «Fulfil the Last Wish of Hopelessly Sick Child», has taken the group of sick children to Spain where they completed a course of dolphin therapy (ZN.UA №43 from 26.11. 2011).

Abroad in the last 15 years the statements specifying the possibility of using the effective and economically defensible alternatives of the dolphin therapy (Lukina L.N., 2007) have been published. It is offered to use the pulse ultrasonic generators with the action reproduction of the dolphin bioecholocator, or the form simulating the wider spectrum of sensory impressions from dolphin therapy (S. Birch, 2001; and others). B. Natanson (1989) suggest to use the water neurophone producing the sounds of dolphins for the deaf and blind patients. It is necessary to tell that among the persons, using such kind of devices, those ones who had earlier some experience of communication with live dolphins, positively speak of their mood and state of health, and those ones who had no such experience, spoke only about a sensation of some relaxation. Today in many child hospitals in Ukraine there are the so-called «sensory rooms» in which the child receives colourful visual, acoustic, tactile and olfactory impressions. Our experience in using the records of sounds produced by dolphins for preschool children in a sensory room has shown that it could not be a complete alternative of dolphinarium visiting, but nevertheless, it enriches the sensory room with the new effective factor, and the children become calm. The mothers of children, who were present at the sensory rooms, clearly spoke about some relaxed state after the end of the session. Probably, that in the process of perfection of the radiators of the sound records produced by cetaceans, it is possible to expect their distribution and introduction in the rehabilitation practice.

Thus, today dolphin therapy is a popular kind of animal therapy all over the world, that provoke various discussions at times. At the careful and benevolent relation to the dolphins that were noted down to the Red book, they can live in artificial reservoirs for a long time and breed. The latter one is the evidence of their nervously-corporal comfort. If thus we manage to use their ability for the children's health recovery it, in our opinion, justifies those inconveniences which the animals can experience at this. Owing to the popularity of the dolphin therapy sessions and the other kinds of animal therapy among the parents of the sick children a necessity of integration of the medical science and practice in this field of knowledge has been about to happen. Today the optimal thing is considered when the doctor heads the centre of the dolphin therapy or work in it as a consultant. Then this kind of rehabilitation appears as one of the components of the series of measures towards the restoration of the normal course of the child's psychological development. Possibly, that time to strengthen a medical control over the dolphin therapy realization and its conformity to the standards and requirements of the Ministry of Health of Ukraine has come.

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THE OZONE THERAPY AS PREVENTION OF AGEING OF THE LYMPH NODE

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ABSTRACT — Morphologic and functional characteristics of lymph node of animals of old age after ozone correction are described in the article. The signs of aging of lymphoid tissue namely sclerosis, changes of cytology and area of structural and functional zones of lymph node responsible for drainage and immunity become clearly with age. We show that structural and immune reaction of zones of lymph node is modulated and sinus system of lymph node is optimized after ozone application. It is the base for using ozone therapy for improvement of immune and drainage functions of lymph node in the old organism.

KEYWORDS — lymph node, gerontology, ozone therapy

On the base of data of new studies it is clear that the average length of human life is increased but health isn't improved [14, 15]. This tendency is increased by diseases connecting with the age and being the main reason of the death. Moreover lymphatic system in pathogenesis is also connected with this tendency. Changes of lymphatic system disturb the processes of detoxication in lymphatic region [7, 9, 11]. So study of changes in regional lymph node is very important for understanding of pathogenesis and sanogenesis and also for search of effective methods to become longer age useful for active and creative human life [2, 9–11].

In this connection the most interested method is ozone therapy because of positive influence on organism [6, 8, 9]. But lymphatic component of the action of ozone therapy isn't studied yet. So it is necessary to give scientific base for using ozone therapy to inhibit aging lymphoid and lymphatic systems. The results of the study have practical meaning for optimal rehabilitation in elder and old patients.

The aim of the present work is to study structural and functional reaction of lymph nodes of old rats in reply to ozone therapy.

METHOD

Experiment with animals was made on the base of the principles of biological ethics, laboratory practice (GLP), "International recommendation for carrying out of medical and biological studies with animals"



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(1985) and order of Ministry of Health of Russian Federation № 267 from 19.06.2003. 160 white rats-male of Wistar breed of different ages (young rats were 3–5 months, old rats were 12–15 months) [4] in the conditions of Novosibirsk city have been used in experiment. Animals were given extruded mixed feed PK-120-1 and unlimited quantity of water. Ozone application with ozonized olive oil during 15-20 minutes every other day was made on the region of lymph accumulation of groin lymph nodules, course was 14 applications. Ozone saturation of olive oil was made with apparatus OP1-M with device for ozonization. Lymph therapy with applications show positive results without side effects [3], and this result is a base for using applications in medicine practice. Groin lymph nodes were studied with histological method [1, 5, 12, 15]. Pieces of lymph nodes were fixed in 10% neutral formalin, processed and embedded with paraffin. Histological slices were made and stained with hematoxylin and eosin, azure and eosin, toluidine blue. Morphometric analysis of structural components of lymph node was made with morphometric test grid [1] which was put on the slice of lymph node. The number of nodes or intersections of grid on the slice totally and on each structural component separately were counted and recounted in percents. Obtained data were statistically processed with program of statistical analysis StatPlus Pro 2009, AnalystSoft Inc.

RESULTS AND DISCUSSION

Lymphatic nodes are the part of lymphatic stream and change with age because of sclerotic process. This process is accompanied with thickening of capsule,

appearing of connective tissue around vessels and sinuses in lymphoid parenchyma of lymphatic nodes of old animals. At the same time subcapsular sclerosis parallel to boundary sinus of peripheral cortex is localized (Fig. 1). We think that subcapsular sclerosis is a result of unfavorable ecologic environment and makes difficult to pass lymph in compartment of lymph node. Area of structural and functional zones of lymph node responsible for cellular and humoral immunity is changed in lymphatic node of old rats (Table 1).

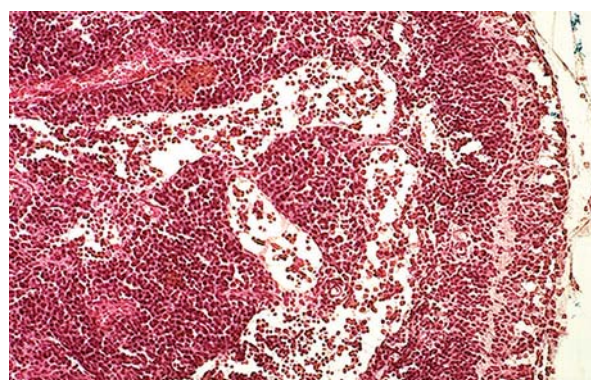


Fig. 1. Elements of subcapsular sclerosis in cortical plateau, extended sinuses of lymph node. Old rats. Hematoxylin and eosin stain. Magnification: ocular 7, objective 10.

in periphery or in form of separate strip but structure of paracortex is locally impoverished with cells. Insufficiency of cellular component of immunity of lymphatic node of old rats is formed. Medullar sinuses of lymphatic nodes of old rats looked as extended formations running through tissue of lymph node (Fig. 1). Medullar sinus size was increased in 2,3 times (Table 1).

These changes show disproportion between inflow of lymph in lymph node and outflow of lymph from lymph node. Extended sinuses are structural prerequisite for slowing down of flow of lymph, lowering of drainage and detoxication functions and lowering of immune functions of lymph node. Functionally lymph node is in the compensation state that is the sign of unfavorable ecologic environment, thus lymph node is an indicator of external and internal environment [7, 15].

Ozone therapy may be prophylactic of early aging of lymphoid and lymphatic systems. Transdermal effect of ozone application contributes the changing of structural and functional zones of lymph node changed with age and environment. It was marked statistically reliable decrease of area of cortical plateau in 1,7 times, area of paracortex in 1,5 times, area of medullar sinus in 1,8 times, and lowered proliferative activity of germinative centers of lymphoid nodules on

Table 1. Area of structural and functional zones of lymphatic node in different ages and after ozone application, %

Structures of lymph node	Young animals (3–5 months)		Old animals (12–15 months)	
	Without correction	Ozone application	Without correction	Ozone application
	1	2	3	4
Capsule	1,16±0,09	0,98±0,08	1,62±0,07*	1,79±0,10*
Subcapsular sinus	0,57±0,07	0,56±0,06	0,41±0,04	0,49±0,03
Cortical plateau	1,20±0,09	1,53±0,08°	1,90±0,08*	1,12±0,08*
Lymph nodule without germinative center	1,16±0,06	1,25±0,06	1,24±0,08	1,35±0,06
Lymph nodule with germinative center	1,61±0,17	1,58±0,17	1,37±0,12*	1,21±0,08
Paracortex	7,14±0,67	5,92±0,53°	8,94±0,49	5,77±0,38°
Medullar cords	5,20±0,32	4,11±0,27°	5,02±0,34	4,88±0,25
Medullar sinus	1,30±0,12	1,63±0,10°	2,94±0,20*	1,59±0,17°
Total area	19,35±1,03	17,55±1,11	23,44±1,35	18,20±0,68°

Note: ° $P_{1-2, 3-4} < 0,05$; * $P_{1-3, 2-4} < 0,05$

Cortical plateau of lymph node of old rats is increased in 1,6 times in comparison with that of young rats. Area of lymphoid nodules particularly having germinative centers is decreased that is a sign of decreased proliferative process in old lymph node. Paracortex maintains compact arrangement of lymphoid cells or

the side of ozone application of lymph node of old rats (Fig. 2). Peculiarities of effect of ozone application are the increase of area of cortical plateau and maintained high lymphopoiesis in germinative centers of young rats and the decrease of cortical plateau, paracortex and lowered lymphopoiesis in germinative centers of

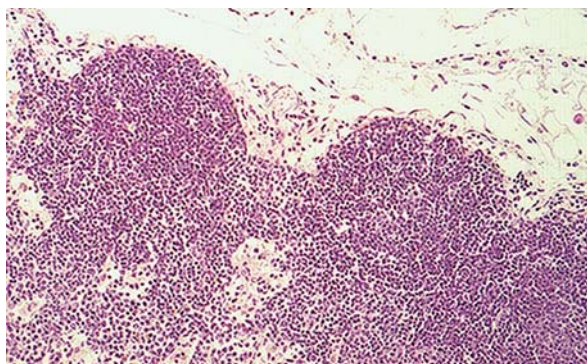


Fig. 2. Lymphoid nodules (follicles) linked with bridge of cortical plateau. Cortical shunts. Decrease of size of cortical plateau and sinuses. Old rats. Ozone application. Hematoxylin and eosin stain. Magnification: ocular 7, objective 10.

old rats. The most of structural and functional zones of groin lymph nodes were changed in similar way and in young and in old rats as a response on ozone therapy (Table 1). Optimization of sinus system of lymph node is a result of ozone application that is very important for drainage and detoxication function of lymph node under the unfavorable environment. Modulating effect of ozone therapy namely decrease of high indexes and increase of low indexes of area of structural and functional zones of lymph node may be supposed on the base of character of change of area of cortical plateau in young and old rats. This regularity is appeared for the most of structural and functional zones of lymph node of old rats after ozone application (Table 1).

CONCLUSION

Structure of lymph node of old rats have signs which reflect total process of aging and become more clearly under the unfavorable environmental conditions. It is related to connective tissue component and lowered lymphopoiesis. Ozone correction cause different in intensity structural response of lymph node and have modulating effect. Old rats show the increase of immune potential and drainage function of lymph node. This conclusion is based on character of changes of structural and functional zones of lymph node. This fact defines expediency of using of ozone therapy in old age in program of endoecologic rehabilitation and measures against aging under the unfavorable environment conditions.

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HIRNORGANISCHE PSYCHOSYNDROME ALS KOMPLIKATIONEN ANDERER GRUNDERKRANKUNGEN

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EINLEITUNG:

Unter einem hirnorganischen Psychosyndrom (alternativ organischem Psychosyndrom) versteht man psychische Störungen und Veränderungen des Menschen als Folge einer organischen Erkrankung des Gehirns bzw. oder einer Krankheit mit Gehirnbeteiligung. Ursachen für ein solches organisches Psychosyndrom sind z. B. Schädel-Hirn-Traumata, Verletzungen mit Schädelbeteiligung, Alkoholsucht, Drogenabhängigkeit, Medikamente, Hirntumore bzw. Metastasen des Gehirns, Durchblutungsstörungen oder Infektionen.

Auch entstehen psychische Veränderungen eines Menschen als Folge einer allgemeinen Störung des Körpers, insbesondere des Wasser- und Elektrolythaushaltes. Der Begriff organisches Psychosyndrom implementiert eine organische Bedingtheit und somit ist diese Erkrankungs- und Störungsgruppe abzugrenzen gegen endogene, durch Veranlagung bedingte Psychosen wie Schizophrenien, Depressionen und Manien, sowie gegen exogene, durch äußere Faktoren ausgelöste psychotische Störungen. Als für das organische Psychosyndrom typisch gilt die begleitende Störung des Bewusstseins, der Wachheit und/oder der Orientiertheit, die nicht zwingend bei endogenen oder exogenen Ursachen auftritt. In der klinischen Praxis hat sich bewährt, zwischen akutem und chronischen organischen Psychosyndrom zu unterscheiden.

Organische Psychosyndrome treten aber auch im Rahmen der intensiv-medizinischen Behandlung auf, dies bedarf einer gesonderten Erläuterung.

Allgemeine Symptome eines organischen Psychosyndroms sind u. a.

1. Merkfähigkeitsstörungen
2. Aufmerksamkeits- und Konzentrationsstörungen
3. Bewusstseinsstörungen
4. Orientierungsstörungen
5. Denkstörungen
6. Hirnlokale Störungen
7. Störungen der Psychomotorik
8. Antriebsstörungen
9. Wahnideen
10. Störungen der Affekte z.B. depressive Verstimmung oder Ängste



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11. Veränderungen der Persönlichkeit.

VERSUCH EINER KLASSIFIZIERUNG

Beim Versuch einer Klassifizierung der hirnorganischen Psychosyndrome erscheint sinnvoll, folgende **akute organische Psychosyndrome** zu unterscheiden:

1. Delirium
2. Amnestisches Syndrom
3. Dämmerzustand
4. Isolierte Bewusstseinstörung
5. Verwirrheitszustand
6. Aspontanes Syndrom
7. Affektives Syndrom
8. Halluzinose.

Die akuten organischen Psychosyndrome können sowohl als Durchgangssyndrome auftreten, d. h. sie gelten allgemein zunächst als rückbildungsfähig, können aber in Abhängigkeit von der Ursache auch chronifizieren.

Chronische organische Psychosyndrome hingegen können in Abhängigkeit von der Ursache stabil oder progredient sein und betreffen im Wesentlichen folgende Störungen:

1. Chronische Angststörung;
2. Demenz (Abnahme der intellektuellen Leistung durch vorwiegend Denk- und Gedächtnisstörungen);
3. Chronisches neurasthenisches Syndrom (Antriebs- und Konzentrationsstörung, weniger Denk- oder Gedächtnisstörungen beeinträchtigen die psychischen Leistungen);
4. Hirnlokale Psychosyndrome (Frontallhirnsyn-

drom, Korsakow-Syndrom, Klüver- Bucy-Syndrom, etc.);

5. Defektsyndrome nach Koma bzw. Begleitsyndrome im Koma (Apallisches Syndrom, Akinetischer Mutismus, Hypersomnie-Syndrom).
6. Organische Persönlichkeitsänderung (auch „Wesensänderung“)

Klinisch praktikabel erscheint eine Unterteilung in 3 Hauptformen der organischen Psychosyndrome:

1. Akutes organisches Psychosyndrom;
 - a) mit Bewusstseinsstörungen;
 - b) ohne Bewusstseinsstörungen;
2. Chronische organische Psychosyndrom;
3. Organisches Psychosyndrom im Rahmen der Intensivmedizin.

Die Diagnostik organisch-psychischer Störungen erfolgt auf der klinischen psychopathologischen Ebene durch Erhebung der Anamnese im psychopathologischen Befund, internistische Untersuchung, neurologische Untersuchung und Testpsychologie. Diese wird ergänzt durch die funktionelle morphologische Ebene, Elektroenzephalographie, Laboruntersuchung von Serum und Liquor, cerebrale Bildgebung sowie Funktionsuntersuchungen wie SPECT oder PET beinhaltet.

Zur Einteilung akuter organischer psychischer Störungen ist zunächst zwischen den Störungen mit Bewusstseinsstörungen und ohne Bewusstseinsstörungen zu unterscheiden.

Akute organische psychische Störungen mit Bewusstseinsstörungen werden als Delir bezeichnet.

Akute organische psychische Störungen ohne Bewusstseinsstörungen finden sich im Sinne von organischen Halluzinosen, organisch-katatonen Störungen, organisch-wahnhaften Störungen, organisch-affektiven Störungen und organisch-dissoziativen Störungen.

Ursächlich für das Delir sind ZNS-Erkrankungen, metabolische Störungen, posttraumatische Zustände oder auch substanzinduziert wie bei Substanzentzug bei abhängigen Patienten.

Delirien können auch durch Medikamente ausgelöst werden, insbesondere durch Anticholinergika, Dopaminergika, Tuberkulostatika, Virustatika, Antikonvulsiva und verschiedene andere Substanzen auch.

Sehr häufig ist die **akute depressive Störung** im Zusammenhang mit somatischen Erkrankungen.

Auch können depressive Störungen durch Medikamente ausgelöst werden, insbesondere durch ACE-Hemmer, Antibiotika, Antihistaminika, Antimykotika, Antisymphotonika, Beta-Blocker,

Calcium-Antagonisten, Kortikoide, Diuretika, Prokinetika, Antirheumatika aber auch Virustatika.

Zu den **chronischen birnorganischen Psychosyndromen** zählt vor allem die **organische Angststörung**.

Medikamentöse Auslöser einer organischen Angststörungen können Koffein-/ Theophyllin-haltige Medikamente sein, Sympathomimetika aber auch Beta-Blocker, Antiarrhythmika, Dopaminergika, Antibiotika und Serotonin re-uptake-Hemmer.

Weitere chronische organische psychische Störungen wären das **organisch-amnestische Syndrom**, die **leichte kognitive Störung**, die **organisch emotional labile Störung**, die **organische Persönlichkeitsstörung** oder auch das **Demenzsyndrom**.

Eine **Besonderheit** der organischen Psychosyndrome sind die **neuropsychiatrischen Störungen in Zusammenhang mit intensiv-medizinischer Behandlung**, hier finden wir insbesondere:

1. Besondere Koma-Formen und pseudokomatöse Zustände;
2. Organische (körperlich begründbare) Psychosen;
3. Psychoreaktive Störungen im Rahmen der Intensivbehandlung.

Zu den besonderen Koma-Formen und psychokomatösen Zuständen zählt das Apallische Syndrom, das Locked-in-Syndrom, der Akinetische Mutismus.

Als organisch körperlich begründbaren Psychosen, sind insbesondere das Delir als Entzugssyndrom bei Sucht und als Begleitsyndrom bei diffusen Hypoxien und Intoxikationen aber auch die Halluzinose und die amnestischen Syndrome zu nennen.

Recht häufig sind psychoreaktive Störungen im Rahmen der Intensivbehandlung, insbesondere:

1. Angst als Reaktion auf die besondere Umgebung, als Reaktion auf die lebensbedrohliche Krankheitssituation, als Reaktion auf die ungewisse medizinische und soziale Prognose,
2. Depression und
3. Verdrängung ergänzen den Komplex der psychoreaktiven Störungen im Rahmen der Intensivbehandlung. Selten, aber durchaus ernst zu nehmen ist
4. das Problem der Suizidalität, welches in der Selbstwahrnehmung des betroffenen durch Ausweglosigkeit und Einengung der Eigenwahrnehmung als Reaktion auf lebensbedrohliche Krankheitszustände mit geänderter Lebensplanung, insbesondere nach Myokardinfarkt,

Schlaganfall, Malignomen und bei Langzeitbeatmung ohne Bewusstseinsstörung, relevant wird.

Die Pathogenese und Besonderheit neuropsychiatrischer Störungen im Rahmen der Intensivmedizin begründet sich aus

- a) primär cerebralen Ursachen oder
- b) sekundären Störungen cerebraler Funktionen bei primär extracerebralen Erkrankungen.
- c) Dekompensierte Multimorbidität in der Extremsituation der klinisch apparativen Behandlung akzentuiert die Eigenwahrnehmung, mobilisiert Schutz- und Abwehrreflexe und -handlungen und triggert somit eine besondere Psychopathologie hirnorganischer Psychosyndrome in der Intensivmedizin.

Grundsätze der Behandlung:

Beim akuten organischen Psychosyndrom steht die Behandlung der Ursache an erster Stelle, dies ist für die Prognose entscheidend.

Bei neu aufgetretenen chronischen organischen Psychosyndromen sollte zunächst eine Rehabilitation bedacht werden.

Ansonsten bleibt nur die Behandlung belastender Symptome, z. B. einer Depression oder auch die Behandlung von Halluzinationen oder Unruhezuständen.

Neben der Behandlung der das Gehirn schädigenden Grunderkrankung ist auch im Schwerpunkt der Behandlung selektiv die psychiatrische und neurologische Zielsymptomatik zu bedenken.

Kurz- und mittelfristig - gelegentlich auch langfristig ist der Einsatz von Psychopharmaka notwendig und sinnvoll.

Prognose:

Die Prognose der organischen Psychosyndrome ist von der Ursache abhängig.

Je schneller die Ursache der Schädigung des Gehirns behoben wird, desto besser ist die Chance auf Erholung der Hirnsubstanz.

Rasches Handeln, insbesondere im Rahmen intensiv-medizinischer Maßnahmen und rasch einsetzende rehabilitative Trainingsmethoden sind also eine Grundvoraussetzung zur Verbesserung der Prognose.

PRENATAL DIAGNOSIS OF COARCTATION AND INTERRUPTION OF THE AORTIC ARCH BY 2B AND 3-DIMENSIONAL ECHOCARDIOGRAPHY

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ABSTRACT — OBJECTIVE. Coarctation and interruption of the aortic arch is occupied the 4th place among all the congenital heart defects. Prenatal diagnosis of it is very important for the planning of the delivery and the The purpose of this study was to evaluate the diagnostic possibilities of the sighting of the fetus echocardiography in the two-mode imaging and a three-dimensional reconstruction for prenatal detection of aortic arch abnormalities.

MATERIALS AND METHODS. The prospective study was based on the analysis of prenatal ultrasound echocardiography datasets in a two-dimensional mode and 3D-reconstruction of 2 fetus groups, were examined between 20 and 36 weeks of gestation. 50 "healthy" fruit (I group) were included in the first (control) group. The second group consisted of 15 fetuses with coarctation and interruption of the aortic arch (II group).

Volume data sets of all fetuses, examining by 2D US, were acquired by 3D and cine 4D using spatiotemporal image correlation (STIC) software. Various additional rendering tools were applied. Color and power Doppler were added to the volumes acquired. A retrospective offline analysis was performed. Neonatal echocardiography and pathological examination were performed to verify the prenatal diagnosis.

RESULTS. In the analysis of 3D – «cardiac volume» in 37 patients (74%) of groupe I, aortic arch in longitudinal section was successfully visualized to exclude the pathology. 2 group of fetuses (aortic arch abnormalities, n=15): In 7 (46%) cases abnormality of the heart and great vessel was demonstrated by 2D and 3/4D ultrasound volume did not add to the information in the 2D loop. In 2 cases (16%) 3/4D ultrasound had added value in achieving or enhancing diagnosis in 2/6 of diagnosed cases and a definitive diagnosis was made only after 3D examination. This was 1 coarctation of aorta and 1 interrupted aortic arch, Type A. In 5 cases (33%) we had fals-positive results and 2D and 3/4D ultrasound examination were equivalent in it.

CONCLUSION. The datasets from 15 patients suspected of having prenatal coarctation and interruption of the aortic arch demonstrates the complexity of Interpretation echographic data

in forming the final diagnosis, prognosis, and the choice of further tactics. The main method of prenatal diagnosis disease of the aortic arch main method, in our view, is the two-dimensional imaging mode while 3/4D-modes are optional, but very usefull in several cases. However, no single module is sufficiently accurate for the diagnosis of aortic arch abnormalities, each case requires different and appropriate module of visualization. 3/4D addition enhances precision of diagnosis by providing planes and data that «flesh out» the 2D ultrasound examination.

KEYWORDS — prenatal diagnosis, fetal echocardiography, coarctation of aorta, interruption of the aortic arch

TOPICALITY

Coarctation and interruption of the aortic arch is occupied 4th place among all the congenital heart defects. Among the critical CHD incidence of coarctation of the aorta is 10% and interruption of the aortic arch — 1% (1, 15).

A high percentage of critical forms of coarctation of the aorta due to the need for prenatal detection of these forms of cardiac defect. Being a typical duct-dependent pathology, in which livelihoods newborn maintained until the closing of the ductus arteriosus, critical forms of pathology of the aortic arch require emergency specialized care after birth. Less severe forms of aortic coarctation, in which a moderate narrowing of the aortic isthmus that is light on the severity of clinical symptoms after birth. An estimated 60% to 80% of newborns with isolated coarctation of the aorta are sent

home as "healthy" children (1). This result is in a late detection of defects in this group of children, with the deteriorating results of delayed surgery (1, 15).

Prenatal diagnosis of pathology of the aortic arch is an important task of prenatal medicine, the solution of which will provide timely specialized care after birth, reduce infant and child mortality rates.

However, the detection of prenatal pathology of the aortic arch is associated with objective difficulties and the percentage of diagnosis of this disease is less than 43%.

Prenatal diagnosis of malformations of the aortic arch is the subject of a small number of studies (4,8,15), it confirms the diagnostic complexity of this anomaly. In this regard, there is a need for new diagnostic techniques that improve accuracy and results of diagnostic search for examination of the fetal heart.

The last decade has been steadily increasing number of publications on the use of 3/4-dimensional scanning modes (5, 6, 15) as a means of improvement of prenatal diagnosis of heart diseases, including diseases of the aortic arch.

The purpose of this study was to evaluate the diagnostic possibilities of the sighting of the fetus echocardiography in the two-mode imaging and a three-dimensional reconstruction for prenatal detection of coarctation and interruption of the aortic arch, the study of the evolution of fetal defect with the analysis and definition of outcomes, postnatal prognosis and determining the causes of diagnostic errors and their possible solutions.

MATERIALS AND METHODS

The prospective study was based on the analysis of prenatal ultrasound echocardiography datasets in a two-dimensional mode and 3D-reconstruction of 2 fetus groups. 50 "healthy" fetus (I group) were included in the first (control) group. The second group consisted of 15 fetuses with coarctation and interruption of the aortic arch (II group).

The study was conducted in the perinatal cardiology center based Russia, Moscow, Bakoulev SCCVS, Perinatal Medical Cardiocenter from 2011 to 2012.

Cases of isolated coarctation of the aorta were included in the study or the combination of "small" heart anomalies:

- with hypoplasia and stenosis of the aortic valve – 2 cases;
- with bicuspid aortic valve – 2 cases;
- with ventricular septal defect (VSD) – 9 cases;
- defective aortic-pulmonary septum – 1 case.

These observations were excluded from this study:

- the combination of this disease with combined CHD because the changes of hemodynamics

and morphometry of fetal heart in these cases are determined, first of all, a complex abnormality of the fetal heart, and do not reflect his true changes associated with obstruction in the aortic arch;

- with a positive parents decision to finish the pregnancy (post-mortem study of abortions were not performed).

The second group of pregnant women's age ranged from 24 to 39 years (Table 1, 2, 3) and averaged 29.8 years. The percentage of "age" of patients (over 35 years) was extremely low (1 case) — 6% of the total surveyed.

The reason for the patients to come in our department were: 1) suspicion of CHD in the fetus (II group), 2) a family history (in most cases — the birth of children with CHD from previous pregnancies) or private desire to be tested in the cardiocenter (I group).

All patients in group I were examined twice — in the 20–27 and 30–34 weeks gestation. 5 patients in Group II were examined twice like the group I and 10 patients were examined once.

In all cases the diagnosis is established by the fetal echocardiography, including a study of the 2D-scan mode using pulsed wave, color and power Doppler mapping and 3D-multiplanar mode scan. The study was conducted on the unit Voluson 730 Pro (GE Medical System) with convex and 3/4D transducer 3.5–5 MHz in the software Fetal Cardio mode by transabdominal access.

The protocol of the fetal heart examine, developed and introduced into clinical practice in Bakoulev SCCVS, Perinatal Medical Cardiocenter, which is based on the segmental approach to Van Praag in modifying Becker.

The following key indicators were studied to assess morphology and hemodynamics and comparative analysis: diameters of ascending part, the proximal and distal part of the arc, the diameter of the isthmus, the diameter of the descending aorta, the diameter of the ductus arteriosus and evaluation ratio of isthmus diameter to the diameter of ductus arteriosus. These parameters were carried out in the gray scale in the longitudinal projection of the aortic arch and in transversal-section — V-sight of connection ductal arch and the aorta.

The nature of blood flow in the aortic arch was assessed by color Doppler mapping and power Doppler mode.

Additional parameters, indirectly characterized by the pathology of the aortic arch, were used in the study:

- Ratio of left and right end-diastolic ventricular dimensions (the presence of ventricular disproportion),

- diameters of the great vessels, and their ratio (the presence of arterial disproportion),
- thickness of ventricular myocardium (presence left ventricular hypertrophy,
- diameter of atrioventricular and semilunar valves, their ratio of the left and right heart ,
- the dimension of the right atrium.

Each fetus heart was taken in a three-dimensional reconstruction ("heart volume") in the 4-chamber view. 3D «volume» multiplanar mode imaging was used to obtain transversal-sectional and longitudinal sections of the aortic arch and ductal arch. The criterion of successful visualization of the aortic arch was to obtain continuous images of the ascending aorta move in an arc, the isthmus and the proximal descending aorta. Criterion for successful imaging of ductal arch was to obtain continuous images of the outflow of the right ventricle, pulmonary valve and arteria, ductus arteriosus and proximal descending aorta.

Information on each patient is entered into the database, made in Excel. Standard Excel functions were also used to calculate the values of arithmetic studied variables (M) and standard deviation ($\pm$ sd). The bulk of the statistical data is processed using the software package STATISTICA company StatSoft, Inc., (USA), version 6.0.

RESULTS

All 50 patients of the control group were examined in the first two months of life and confirmed the absence of disease of the heart and great vessels was confirmed.

Examined parameters in the control group were like indicators of the fetal heart at different stages of pregnancy, previously calculated in Bakoulev SCCVS, Perinatal Medical Cardiocenter on a representative sample of 2,000 women with normal pregnancy and no fetal pathology (link to the book).

One of the new morphometric criterias, which was not used before, was the ratio of isthmus diameter to the diameter of ductus arteriosus. In 44 patients of the control group (88%), the ratio was more than 0.8, that is, the diameter of the isthmus was greater or almost equal to the diameter of the ductus arteriosus. In 6 fetuses (12%), this ratio in the range 0,76–0,8 mainly by increasing the diameter of the ductus arteriosus.

In the analysis of 3D-«cardiac volume» in 37 patients (74%) of groupe I, aortic arch in longitudinal section was successfully visualized to exclude the pathology. In 7 patients (14%), visualization of the aortic arch was successfully for trace its continuity, but it could not exclude the narrowing of the isthmus. In 6 patients (12%) of the control group, it was not possible to visualize the

aortic arch by the three-dimensional reconstruction.

Groupe II consisted of 3 subgroups (A, B, C). A sub-group consisted of patients without CHD (Table 1), subgroup B — patients with coarctation of the aorta, which needed only dynamic control after birth without surgery (Table 2), subgroup C — patients with coarctation of the aorta, requiring surgery and interruption of the aortic arch (Table 3).

Subgroup A. 5 infants (33%) of the 15 patients of the group II had clinical and echocardiographic examination in the neonatal period to exclude the presence of the disease. All five «healthy» newborns had prenatal predictors of fetal aortic coarctation appeared after 30 gestation week:

- ventricular disproportion: in 4 cases (80%) — the ratio $RV / LV > 1.6$;
- arterial disproportion: in 5 cases (100%) — ratio of the diameter of the aorta to the diameter of the pulmonary artery < 0.8 ;
- the ratio of isthmus diameter to the diameter of ductus arteriosus in 3 cases (60%) — 0,66–0,7 and in 2 (40%) cases — more than 0.7;
- ventricular septal defect in 3 cases (60%) had small size (up to 2 mm) and 2 (40%) patients in this subgroup interventricular septum was intact;
- 1 patient (20%) — had tricuspidal regurgitation 2+;
- in 2 (40%) patients — pericarditis.

Subgroup B. 2 out of 15 patients of the study group (13%) had a pressure gradient on the isthmus near 20 mmHg in neonatal period and needed dynamic control but no surgery.

Manifestation ultrasound indicate pathological changes in these two cases were in the third trimester of pregnancy. In both cases:

- absence of ventricular disproportion
- intact interventricular septum,
- arterial disproportion,
- the ratio of isthmus diameter to the diameter of ductus arteriosus — 0.6–0.7.

In one case, the image of the aortic arch In a three-dimensional reconstruction was received successfully and showed normal heart, in the second case it was highly suspicious for the presence of tubular coarctation.

Subgroup C. 8 cases out of 15 (53%) were from the subgroup C.

2 cases of 8 (25%) with postnatal diagnosis — interruption of the aortic arch (Fig. 3, 4). Both cases displayed prenatal ultrasound signs of manifestation of obstructive lesions of the aortic arch earlier — at 23 and 24 weeks of pregnancy:

- No (in both cases) ventricular disproportion,
- ventricular septal defect - 5.4 and 6.3 mm;
- the presence in one case of hypoplasia and steno-

Table 1.

Patient N°	Age	Gestation age	Ventricular disproportion	Arterial disproportion	Ao/duct.	VSD (mm)	Prenatal diagnosis	Postnatal diagnosis
1	31	36	++	+	0.60	1.5	AC	Normal
2	30	33	-	+	0.77	1.9	AC	Normal
3	28	32	++	+	0.75	1.4	AC	Normal
4	28	34	++	+	0.90	-	AC	Normal
5	32	32	++	+	0.85	-	AC	Normal

Ao/duct — Istmal to Ductal ratio, VSD — ventricular septal defect, AC — aortic coarctation, ++ — strong feature, + — moderate feature, - — no feature

Table 2.

Patient N°	Age	Gestation age	Ventricular disproportion	Arterial disproportion	Ao/duct.	VSD (mm)	Prenatal diagnosis	Postnatal diagnosis	Outcome
6	33	35	-	+	0.9	-	AC	AC	Need for surveillance
7	29	36	+	+	0.8	-	AC	AC	Need for surveillance

Ao/duct — Istmal to Ductal ratio, VSD — ventricular septal defect, AC — aortic coarctation, ++ — strong feature, + — moderate feature, - — no feature

Table 3.

Patient N°	Women's age	Gestation age	Ventricular disproportion	Arterial disproportion	Ao/duct.	VSD (mm)	Prenatal diagnosis	Postnatal diagnosis	Outcome	
8	25	23	-	++	Ductal-4	6.3	Interrupted aortic arch	Interrupted aortic arch Type B	Surgery	Microdilation p22 q 11
9	29	24	-	++	0.3	5.4	AC	Interrupted aortic arch Type A	Intranatal death	
10	39	24	-	+	0.4	5	AC	AC	Surgery death	
		30	-	-	Ductal-5	5.3	Interrupted aortic arch?			
11	30	23	-	-	0.7	3.1	AC	AC	Surgery	
		33	+	+	0.66	3.2				
12	27	24	-	+	0.71	2.6	AC	AC	Surgery	
		32	+	+	0.64	2.8				
13	27	25	-	+	0.7	3	AC	AC	Surgery	
		32	+	+	0.7	3.1				
14	24	28	++	+	0.5	-	AC	AC	Death at the age of 3 days	Multiple malformation
		32	++	+	0.49	-				
15	33	31	++	-	0.57	3	AC	AC	Death at the age of 2 days	Multiple malformation

Ao/duct — Istmal to Ductal ratio, VSD — ventricular septal defect, AC — aortic coarctation, ++ — strong feature, + — moderate feature, - — no feature

sis of the aortic valve;
 - arterial disproportion: $\text{diametrAo/D LA} = 0.5$ and 0.38;

- the diameter of the ductus arteriosus 4 and 4.5 mm (22 and 23 ned.gestatsii);
 - inability to visualize the aortic arch;

- in one case — fetal hypotrophy and impaired fetoplacental blood flow.

In both cases dynamic echocardiographic control was not made: in one case — geographical distance and in the second case — fetal death due at 28 weeks gestation (at the autopsy — interruption of the aortic arch type C). In one case, after the birth, Computed Tomography-angiography (Fig. 4) — interruption of the aortic arch type B, with karyotypic analysis — deletions of chromosome p22q11. Newborn was operated successfully at the age of two days. In one of two cases, in 3D-image reconstruction, the interruption of the aortic arch can clearly be seen (Fig. 3).

6 of 8 cases (75%) with verified postnatal diagnosis — coarctation of the aorta, which needed in surgical correction - characterized by a variety of degree of obstruction and concomitant extracardiac disease. 2 of 6 (33%) of cases of coarctation of the aorta had the presence of multiple fetal malformations: in 1 case — kidney aplasia and dysplasia of the right hand and fetal hypotrophy, in the case of 2-facial cleft in combination with polyhydramnios. In these cases, the suspicion of disease of the cardiovascular system in fetuses arose at 27 and 30 weeks of pregnancy.

In both cases, it was noted:

- the presence of ventricular disproportion RV/LV=1.5 and 1.6,
- the ratio of isthmus diameter to the diameter of ductus arteriosus 0.5 and 0.7,
- in one case ventricular septal defect — 6mm and arterial disproportion — 0.7 and diffuse pericarditis,
- in the second case — the central muscular defects — 3 mm and defect aorto-pulmonary septum — 5 mm and the absence of arterial disproportion. Both infants had low Apgar score — 4–5 and 4–6 scores, and died at the age of 2 and 3 days. The diagnosis was verified at autopsy.

In 1 of 6 cases aortic coarctation (16%) the manifestation of obstructive process of the aortic arch was at 23 weeks' gestation:

- the presence of arterial disproportion (0.6),
- a low ratio of isthmus diameter to the diameter of ductus arteriosus — 0.4,
- multiple ventricular septal defects with a maximum size apical localization — 5 mm
- no ventricular disproportion.

So, prenatal diagnosis at 23 weeks gestation — tubular hypoplasia of the aortic arch, critical coarctation.

Dynamic examination at 32 weeks showed the ultrasound image changed: no ventricular and arterial imbalances, multiple ventricular septal defects with

max — 5.4 mm, the diameter of the ductus arteriosus — 6 mm, the area of the isthmus was not visualized in 2D mode and 3D-multiplanar scanning. Prenatal diagnosis — interruption of the aortic arch.

After birth — critical aortic coarctation with tubular hypoplasia were diagnosed in CT-angiography. The child was operated on the 5th day of life and died on the 10th day after the surgical.

In 3 of 6 cases of aortic coarctation (50%) infants were successfully operated in one week of life and feel good now (Fig. 2). In these cases, prenatal ultrasound diagnostic identified:

- 1 case — ventricular disproportion — 1.4;
- in 2 cases — arterial disproportion — 0.7 and 0.72;
- in all cases, the ratio of isthmus diameter to the diameter of ductus arteriosus — 0.6–0.7;
- in 1 case — the bicuspid aortic valve; in one case — aortic kinking of the proximal descending aorta;
- in 2 cases — ventricular septal defect — 2.6 and 3.4 mm.

Ultrasound manifestations of this disease occurred in 1 case in 31 weeks, and in two cases — at 23 and 25 weeks of gestation. In 3D-mode in one of three cases the image of aortic arch was visualized and showed aortic coarctation, but can not determine its degree (Table 1).

DISCUSSION

The small size of the group of patients gives the results of this study should be considered preliminary, to assist in determining the main directions of scientific research in the broader project.

The datasets from 15 patients suspected of having prenatal coarctation and interruption of the aortic arch demonstrates the complexity of interpretation echographic data in forming the final diagnosis, prognosis, and the choice of further tactics.

The reason for the high percentage of false-positive results (33%, which is consistent with the data of foreign literature) is still not definite. However, analysis of the gestational age of pathological process manifestation and subsequent outcomes, reveals the following pattern. Patients with suspected coarctation or interruption of the aortic arch, identified before 25 weeks of pregnancy, did not have there were no false positive results. Pathological process manifestation in the 3rd trimester of pregnancy is accompanied by a high rate of false-positive results (50%). It is known that the aortic arch coarctation refers to progressive disease and may manifest not only in the early neonatal period at time the process of closing the ductus arteriosus, but



Fig. 1. Patient 11. Gestational age — 23 weeks. Aortic coarctation. 3D-reconstruction, multiplanar mode

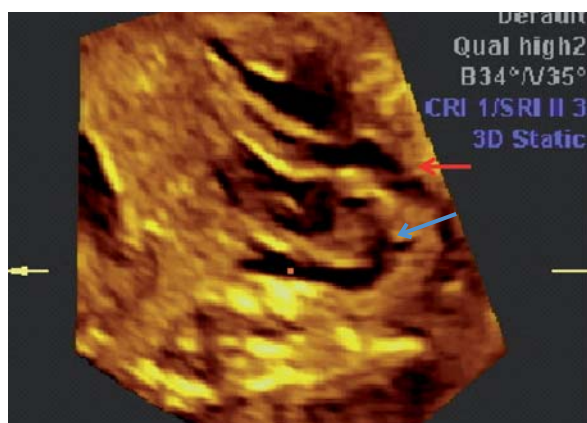


Fig. 3. Patient 8. Gestational age — 23 weeks. Interruption of the aortic arch (red arrow). 3D-reconstruction, multiplanar mode. Blue arrow — ductus arteriosus

in infancy, childhood and even adolescence. The first ultrasound signs of disease process prenatal appearance is possible in the second and in the third trimester. However, the ventricular disproportion may be effect of functional disorders in transient hypoxia, abnormality function fetoplacental complex, anemia in pregnancy in the 3rd trimester of pregnancy. In this case, ventricular and arterial imbalances and physiological isthmus hypoplasia of the aortic arch in the fetus like a coarctation.

The emergence these echographic fetal heart changes during the second trimester of pregnancy is correlated with the absence of false-positive results and the maximum expression of anatomical changes of the aortic arch (aortic arch interruption and tubular hypoplasia with critical coarctation). Echographic pattern in these cases: the absence of ventricular disproportion, large ventricular septal defect (more than 5 mm), with the most pronounced in the whole study group arterial disproportion and the lowest the ratio of isthmus diam-



Fig. 2. Patient 11. Age — 3 days. Aortic coarctation. Computed Tomography — angiography, multiplanar mode



Fig. 4 Patient 8. Age — 2 days. Computed Tomography — angiography, 3D-reconstruction. Interruption of the aortic arch, Type B (red arrow). Blue arrow — ductus

eter to the diameter of ductus arteriosus. Unfortunately, the echographic study in case of interruption of the aortic arch was not done. The dynamic control of fetal heart with a tubular hypoplasia and critical coarctation at 32 weeks of pregnancy showed lost of coarctation echographic signs (ventricular and arterial disproportion). It may be effect of the development of collateral circulation and adequate hemodynamic functioning right-left shunts (ductus arteriosus, ventricular septal defect and patent foramen ovale). Perhaps, this defect evolution, changing described ultrasound picture, is one of the causes of false-negative results of studies.

Group of fetuses with isolated coarctation of the aorta, which requires dynamic control after birth and requiring surgery, were similar ultrasound picture of the poor echographic manifestations. Group had a unexpressed (or absence) of ventricular disproportion

and arterial disproportion, ratio of the diameter of the isthmus to the diameter of the ductus arteriosus close near to normal, the presence of small ventricular septal defect (up to 3.5 mm), or their absence. However, important is early appearance of these signs (the 2nd trimester) in the case of coarctation requiring surgical treatment and late manifestation of the process (in the 3rd trimester) cases requiring medical supervision only. Poor echographic manifestations of defect in this group are causes the difficulty of diagnosis and prediction of disease progression.

The complexity of interpreting the data in case of a combination of aortic coarctation with multiple malformations of the fetus is to change the influence of echocardiographic picture abnormal intracardiac anatomy and the violation of the fetoplacental circulation with the occurrence of hypoxia. Echographic pattern generally reflects the effect on the anatomy of the heart combination of different factors.

The main method of prenatal diagnosis disease of the aortic arch main method, in our view, is the two-dimensional imaging mode while 3/4D-modes are optional, but very usefull in several cases. One of the obvious drawbacks of the method is worse resolution three-dimensional mode to 2D-mode. Significant loss of image quality is observed in the construction of virtual planes that do not coincide with the plane in the direction of the initial scan (4-chamber section of the heart), whereas in the transvers-sections of the image quality does not change significantly. This explains the tendency of foreign researchers to analyze the anatomy of the heart in transverse planes.

Nevertheless, the most obvious advantages of the method of volume reconstruction should be noted: 1. The possibility of obtaining images of virtual planes, hard to the study of the fetus in two-dimensional mode, but having a certain diagnostic value. 2. The possibility of studying the fetal heart in the mode off-line. 3. Transferability pick up "heart volume" in the form of digital data for remote consulting physicians for primary diagnosis and dynamic monitoring patient.

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ON THE RELEVANCE OF MONITORING OF THE MEDICINES SAFETY

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ABSTRACT — Along with the development of the social system the reorganization and improvement of public health take place. But no country with a high level of economic development allocate sufficient funds for public health costs. This problem has become relevant also in Kazakhstan since the 90s of the last century.

In the dynamic conditions of society at the same time the reorganization and improvement of public health take place accordingly to the material level of the country development. This also applies to the medicines' policy. One of the important aspects of the national medicines' policy is the development of an effective mechanism of medicines' supply to population and public health institutions [5]. Special attention in conditions of healthcare reorganization requires the pharmaceutical supplies, due to its high economic component in the cost. Great attention around the world is devoted to the issues of selection and proper prescribing of medicines.

In Kazakhstan, this issue was sharply raised since the early 90s of the last century, when unfavorable trends in public health indicators occurred simultaneously [4], and numerous foreign medicines, sometimes not always of proper quality appeared in the market. Constant growth of the prices for all services, including those for medical ones and the medicines have led to a situation when "in no other country there are sufficient funds for health care costs" (WHO, 1995).

The most important part of practical health care, providing the high-quality medical care to the population of the Republic of Kazakhstan, are health centers of stationary type. Despite the introduction of restrictive measures to improve the quality of care into the practice of health centers recently, important issues of the safety of pharmacotherapy remain unresolved. Introduction of clinical protocols for treatment and diagnosis only to a certain extent streamlined the medical staff and hospitals in general, however, this measure has not led to the achievement of progressive results in clinical and, moreover, in the economic scale [6]. The



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application of such recommendations by itself is not sufficient to change the behavior of doctors. Medicinal budgets of health care institutions today are not able to provide the full need of hospitalized patients in the medicinal therapy. At the same time there is an acute issue of searching for effective ways to optimize pharmacotherapy. Apart from this problem the issues of rational antibiotic therapy should be highlighted [9]. The currently ongoing reform in Kazakhstan medicines' supply and updating of national medicinal policy requires introduction of modern scientific approaches to solving the problem of rational use of medicines.

According to WHO, "the rational use of medicines requires that patients receive medications appropriate to their clinical needs, in doses that meet their individual needs, for an adequate period of time and at the lowest cost to them and to society."

Thus, when security monitoring of the conducted pharmacotherapy attention should be paid to the

system of rational use of medicines which provides the most cost-effective medicine for the treatment of the individual patient sickness in order to obtain the maximum therapeutic effect [11].

Implementation of the system of rational medicines use provides the opportunity to simultaneously solve the problems of the clinical and economic nature in practical medicine. Pharmacoeconomic analysis is a tool for determining the costs and benefits associated with different methods of treatment, which makes effective use of medicines budgets and health care budgets in general [1].

Rational medicines use is primarily directed to the selection and proper use of medications with proven clinical efficacy and safety. Economic evaluation of the use of medication assumes the analysis of all clinical effects of treatment with the given medication and quantitative assessment of the direct and indirect costs associated with its use.

Many government policies in various countries limit the use of expensive drugs. Often, however, only the cost of the medication is taken into account, but the potential effectiveness of therapy with these drugs is not assessed [14]. At the same time, from the point of pharmacoeconomics application of more expensive, but more effective and safer medication can ultimately lead to better therapeutic result and thus reduce the potential costs associated with the duration of treatment and hospitalization, treatment of complications of pharmacotherapy, prevention of side effects of medicines, including antibiotics [2].

Irrational use of antibiotics leads to the development of a vicious circle: the means that could be used for prevention and treatment of diseases, are spent on managing and treating the wrong selection and treatment, thus the harm and damage is done to the health of the population is harmed and the country's healthcare budget. As a result of irrational use of medicines, such as those in the U.S. each year 8.76 million hospitalizations associated with errors in drug therapy (to treat the effects of spent 47.4 billion dollars) are recorded, as well as 115 million visits to physicians because of problems with drugs (\$7.5 billion), 76.3 million additional prescriptions for correcting errors pharmacotherapy (1.93 billion dollars) are issued, 200,000 deaths related to the misuse of drugs are recorded. Serious adverse events are recorded at 2.1 million people in the country annually and are the fourth leading cause of death. The number of victims of medicinal therapy exceeds three times the number killed every year in car accidents [19].

Of all visits to the doctor 3–15% are due to the deterioration of health linked to the use of drugs; the cause of 3–5% of hospital admissions are the side

effects. It was found that on average, the side effects occur in 10–20% of hospitalized patients, and in developing countries, their number reaches 30–40% [19]. With proper selection and use of medicines about half of all side effects could be prevented. The consequence of uncontrolled, broad, long-term and irrational use of antibiotics has become an increasing problem of microbial resistance to almost all classes of antibiotics, and the patient's death from severe infections. In the U.S. as a result of resistance to antibiotics about 60 000 people die each year and more than \$4 billion is spent additionally [3].

Problem of rational choice of medicines is complicated by an enormous number of registered medicines. Currently, over 9000 products circulate on the pharmaceutical market in Kazakhstan; in Russia — more than 13,000 kinds of medicines, in Japan — 15,000, in the USA — 19,000. Every year thousands of pharmaceutical products worth more than U.S. \$200 billion are sold in the world. This problem is acute in Kazakhstan due to the widespread use of antibiotics [18]. In hospitals of Kazakhstan medicines' side effects are monitored retrospectively upon applying the "yellow cards". When checking a number of medical institutions of the regional center, we found a misunderstanding of the significance of such medicines' monitoring among doctors, as well as their concern that they may be punished for presenting the information on the side effects of medicines.

Not even is conducted an adequate analysis of the obtained retrospective reports of the side effects of medicines, including antibiotics [17].

While conducting a retrospective analysis of pharmacotherapy with antibacterial medicines in the therapeutic department of the emergency hospital it was revealed that antibacterial medicines of the cephalosporin antibiotics group and fluoroquinolones were prescribed. Prescribing of the abovementioned drugs are conducted empirically, without prior analysis of antibiogram pathogen. This, in its turn, leads to undesirable pharmacoeconomic costs without the desired effect, and without control of side effects of medicines [20].

Thus, while conducting a literature review and analysis of medical records of in-patients, once again we see the need for research to determine the importance of monitoring for side effects and pharmacoeconomic analysis of antibacterial medicines of beta-lactam group and fluoroquinolones in therapeutic practice.

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METHODS OF RADIAL DIAGNOSTICS IN VASCULAR DEMENTIA

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ABSTRACT — The structure of all dementias is vascular dementia (VD) — the second by frequency among the elderly people. So, according to C.P. Ferri, M. Prince, (2005), VD is 16% of the structure of all dementias at the elderly people. The incidence of VD is 6–12 cases per one thousand population aged over 70 years. According to official statistics by Ministry of Health of Ukraine, the country has registered 25.5 thousand people with VD, the incidence of 4600 new cases per year, and mortality was 20.5%. The prevalence of vascular dementia increases with age and it is estimated at 1,5–4,8%. According to statistics, 1 case of dementia occurs in 350 healthy individuals, and by 2040 it will already be observed at 1 of 85 persons. Vascular diseases may lead to a number of cognitive impairment from mild to severe, and early detection of deficiency allows the doctor to intervene before dementia occurs. We conducted the study of vascular disorders of the brain using CT and MRI to patients with severe dementia and those who had vascular disorders leading to dementia, such as aneurysms, AVMs, vascular disorders in neoplastic diseases. In the study of disease pathology and cognitive changes of dementia there was found the fact that the changes are usually associated with the changes in the anterior and posterior cerebral arteries and their territories, most often in the thalamus. Other strategic targets: the basal ganglia, the knee of the internal capsule, hippocampus, mamillary bodies and brains of the bridge. For subcortical vascular dementia characterized by loss of small cerebral vessels, the so-called lacunar infarcts. It is the emergence of lacunar infarcts associated step-like progression of the disease. In vascular dementia we have identified the following changes: atrophy (cortical and / or subcortical regions), ventricular enlargement, heart attacks (usually over large areas), gaps of different sizes, hemorrhage, leucomalacia and vascular anomalies (thrombotic plaque, atherosclerosis).

KEYWORDS — vascular diseases, cognitive impairment, lacunar infarct, CT, MRI, PET.

INTRODUCTION

Problem of vascular dementia devoted countless works both in Russia, Ukraine and Europe (N.N. Yakhno; B. Mankovsky; P.V. Chuyskaya;

S.P. Markin; I.V. Damulin; M. Forstein, J. Morris et al.) creates numerous scales, supposedly allows differential diagnosis of vascular dementia from degenerative diseases and, in particular, Alzheimer's and other Bisingera (Pick's disease, Hunting, Parkinson): Ischemic Scale Khachin (1975) rating scale psychological status — M. Folstein et al., 1975; clinical rating scale J. Morris 1993; common scale violations B. Reisberg et al., 1982; neuropsychological tests Folstein et al., 1975 test hours Drawing S. Lovenstone et Ganthier, 2011.

In index HIC-10 (1998), under the dementia (F-00-F03) understood syndrome, brain disease chronic or progressive nature, with severe disorders of the cerebral cortex, including memory, thinking, orientation, awareness, language, erudition, reasoning without obscuring the memory. Cognitive dysfunction often accompanied by a lack of emotional control, social behavior, or motivation (sometimes accompanied by a disorder of cognitive function).

Most often, dementia syndrome occurs in vascular disorders of the brain (F01) due to cerebral infarction, including hypertensive disease.

In clinical practice and literature attempts to differentiate these diseases, using a scale of ischemic Khachin, Romana et al. (1993), and others. However, it is now believed that all these scales have a high specificity but low sensitivity. Roman scale is more sensitive, but also not able to differentiate between these diseases. Attempts to use a number of other methods that would allow for the early stages of the disease carry differential diagnosis and start timely treatment, which is quite justified and possible.

With the introduction into clinical practice of neuroimaging such as CT, MRI, fMRI, PET allowed

to revise the existing views on the problem of how to identify the morphological features of this disease, and their differentiation. First, we should recognize that vascular dementia (SD) are chronic disorders of cerebral blood flow and Discirculatory encephalopathy (YES).

The objective of our research was to identify with the above methods of characteristic morphological changes in the structure of the brain, their location, the size, the study of association cortex, subcortex, the establishment of differential diagnostic features for vascular discirculatory encephalopathy various etiologies (aneurysms, AVMs, tumor lesions of the brain, various vasculopathy).

In our research, we strictly adhere to the classification of vascular dementia, established categorization of ICD-10 (1998), which are divided into cortical dementia, subcortical, mixed and unexplained etiology.

METHODS

We used a CT scanner ASTENYON-SUPER 4 (firm Toshiba), staffed workstation «VITREA-2» and «VITREA-3» firm "VITAL IMAGES Inc." (U.S. and Avanto MRI T1, 5 (Siemens).

Patients were a number of vessels staining to identify existing vascular pathology :100—150 ml of nonionic contrast medium (350.0—370.0 mg I/ml). Bolus 3.0–3.5–4.0 ml/sec., Slice thickness of 0.5 mm. Scan delay: start automatically with bolus SURE START (define a region of interest in which the measured intensity of the staining of blood vessels, when the specified threshold is automatically started helical scanning), delay time (10–20 seconds).

In the study of the internal structure of the method, we used a three-dimensional representation of a (3D volume rendering); shaded surface display method (surface shaded display); method of maximum intensity projection (MIP); method minimum intensity projection (Min IP). The main focus is on the most modern method — a three-dimensional representation of a (volume rendering). Majority of patients we treated, underwent a virtual angiography.

Virtual CT angiography can detect potential causes of acute ischemia, such as arterial stenosis high degree of plaque ulceration or aneurysm with partial thrombosis, which can take thrombolytic therapy or cancellation it. Virtual endoscopy — a method of 3D images without the introduction of the endoscope. It creates perspective views on means of central projection beam instead parallel orientation in space is performed using reformatting (MPR) and by the virtual-endoscopic images.

The results showed that, of the surveyed patients with severe cognitive impairment in patients with

Discirculatory encephalopathy (108 pers.), The share of Alzheimer's disease (AD) with late-onset (senile dementia of Alzheimer's type-pass) account for almost half of the cases of dementia in old age (52 people). At the same time, 23% (30 people). Installed mild dementia (a simple form) and 12% (22 pers.) — Symptomatic dementia (surrender).

Accordingly, the recommendations of national age psychiatry we have traditionally identified the following clinical forms of Alzheimer's disease: late-onset simple form with a predominance in the clinical symptoms of cognitive impairment, paranoid form with mnestic and intellectual decline, paranoid form with a tendency to formation of delusion, false memories and konfabulation products, the combination of signs of cognitive decline konfabulation intelligence-intensive products.

When surrender with Alzheimer disease violation of higher cortical functions reaches a degree of focal cortical disorders.

In the study of disease pathology and cognitive changes in dementia was found that the changes tend to be associated with changes in the anterior and posterior cerebral arteries and their territories, most often in the region of the hippocampus, mamillary cells, tonsils. Other strategic sites included the anterior cortex, basal ganglia, the knee of the internal capsule (Fig. 1–3).

With vascular dementia we have revealed the following changes: atrophy (cortical and/or subcortical), pronounced ventricular enlargement — infarcts (usually in large areas), different sizes of the gap and leukomalacia (Fig. 4–5).

CT can detect early signs of cerebral infarction, which are listed below:

- Loss of differentiation between gray and white matter — the smoothness of cortical gyri, — reduced density of cortical gyri — the existence of linear bands hypertensive affected thrombosis vessels.

Recommended primary research performed without contrast, to avoid the risk of secondary hemorrhage in the area of infarction in the case of the introduction of contrast.

With the introduction of contrast (CTA) can determine the location of occlusion, get detailed information about the topography of the surrounding vascular network, which is very important when planning surgical intervention (Fig. 6).

When using the CT perfusion could specify basic parameters patfiziologich stroke. Application of spiral CT endoscopy examination of the inside of the vessel lumen can provide information on the nature of the stenosis, its size, and most importantly to assess the morphology rather density identified in stenosis.

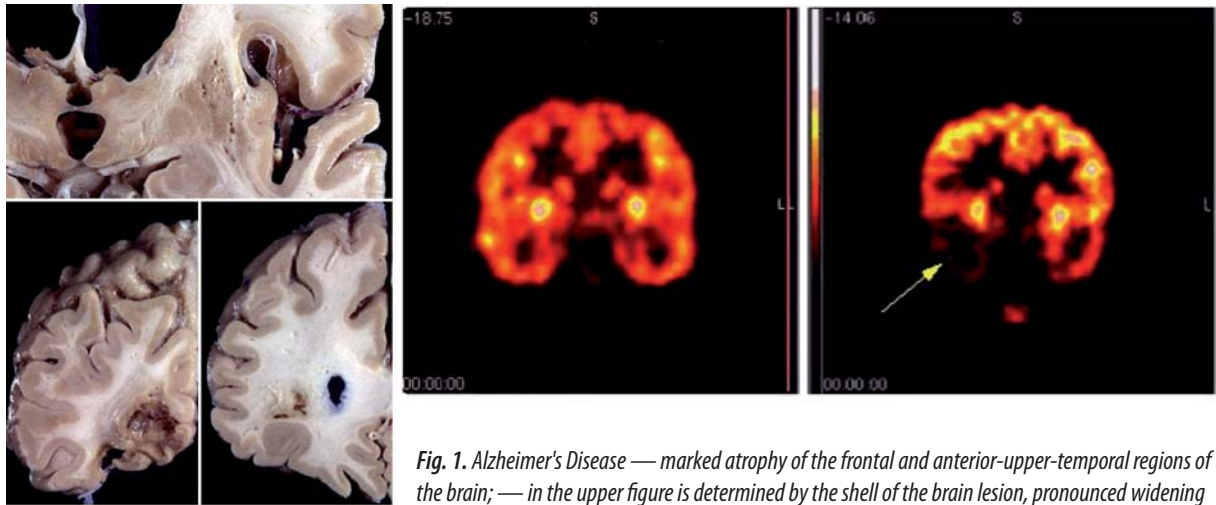


Fig. 1. Alzheimer's Disease — marked atrophy of the frontal and anterior-upper-temporal regions of the brain; — in the upper figure is determined by the shell of the brain lesion, pronounced widening of the brain ventricles and third ventricle; in the lower left figure marked paorazhenie hippocampus; — in the lower figure marked the defeat of white matter in the outer capsule and the globus pallidus; a left lower panel norm lower right figure hippocampal lesion (OFEKT)

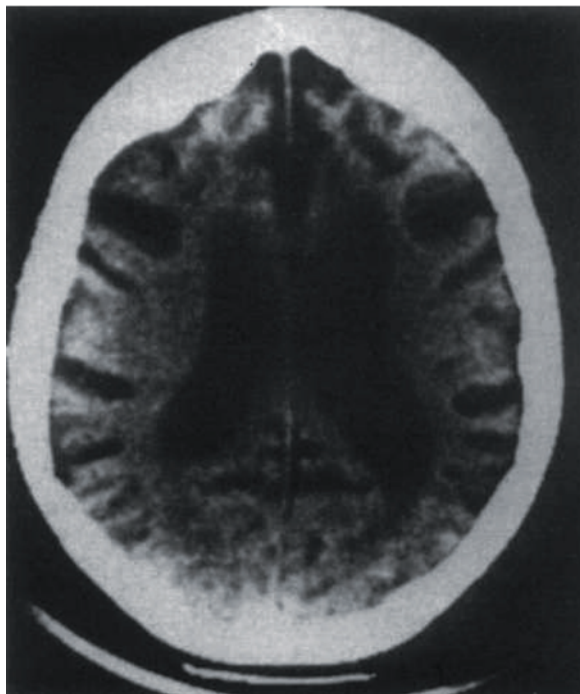


Fig. 2. Alzheimer's Disease. A marked atrophy of the frontal-temporal otodelov brain ventricular enlargement smoothing plotnrosti between white and gray matter of the brain; A marked atrofiya front frontal and superior temporal regions of the brain



ing vessel thrombus, which was extremely important for intravenous thrombolytic therapy. MRI and CT scans as well as gives the same practical evaluation of

lesions of the vasculature, especially in the first 3 hours after the alleged insult. CT usually reveals a stroke in 18–24 hours. However, MRI is inferior CT espe-

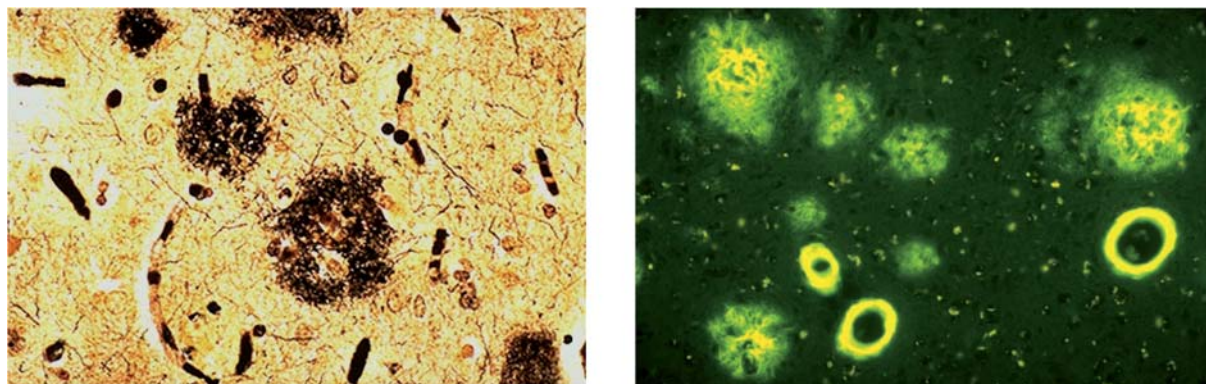


Fig. 3. Alzheimer's Disease — left to neurofibrillary tangles in the structure of the hippocampus; right-amyloid angiopathy, degenerative presynaptic terminals of astrocytes as "senile plaques"

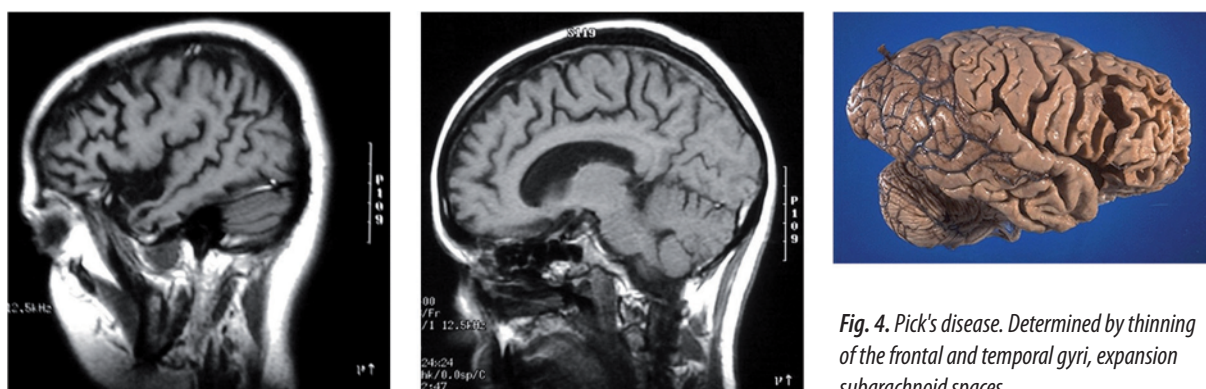


Fig. 4. Pick's disease. Determined by thinning of the frontal and temporal gyri, expansion subarachnoid spaces

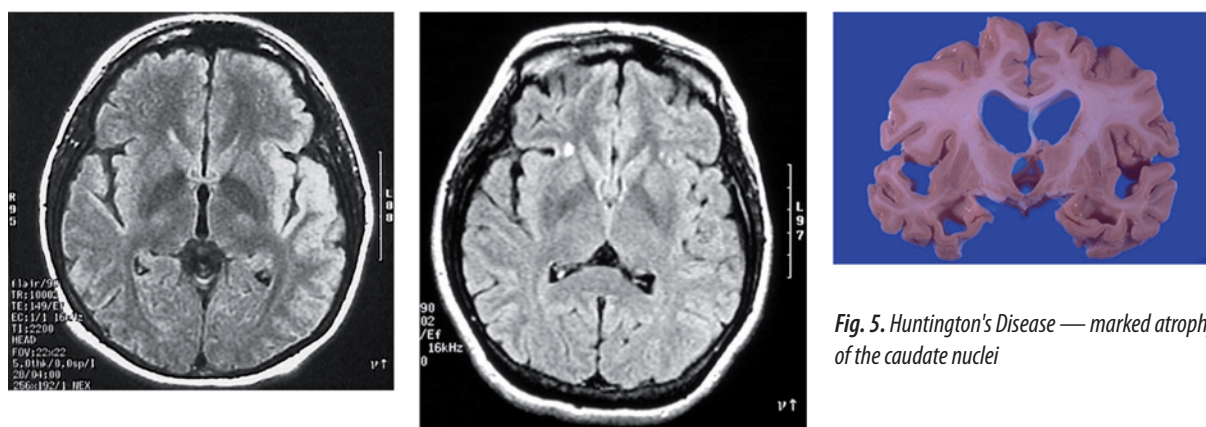


Fig. 5. Huntington's Disease — marked atrophy of the caudate nuclei

cially in the study of patients in an unconscious state, with contraindications to MRI (presence of cardiac defibrillators, pacemakers, artificial metal implants). At subcortical brain lesions, mainly white matter on CT and MRI showed a decrease the density of the white matter, mainly in the zone of the anterior horns

of the ventricles of the brain (periventricular space.) we noted interesting patterns in the clinical picture, the white matter lesions in the projection of the globus pallidus(Fig. 7–8). With the localization of stroke contour medial globus pallidus movement disorder marked by foot, the localization on the lateral dis-

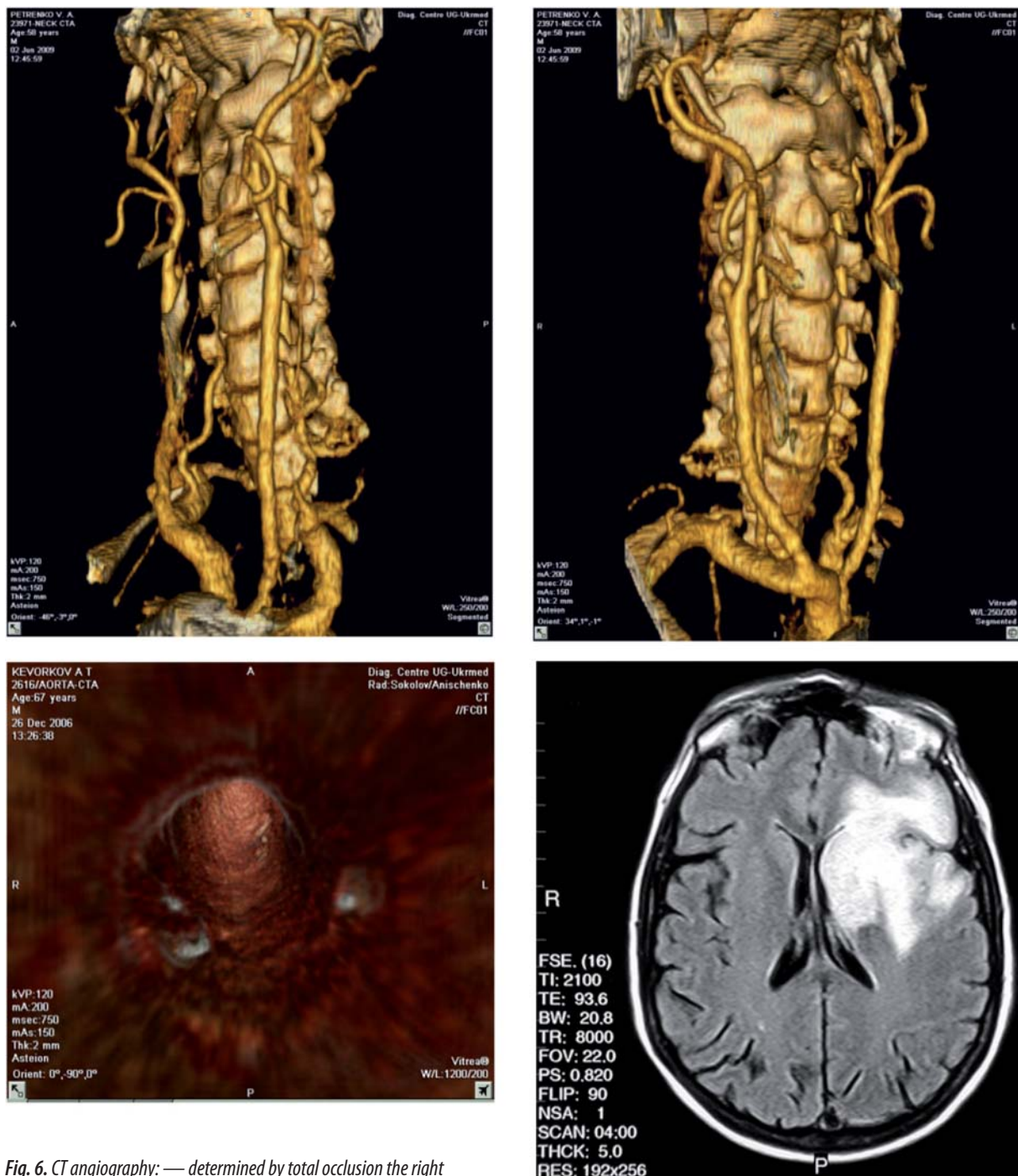


Fig. 6. CT angiography: — determined by total occlusion the right internal carotid artery narrowing to 50% the left internal carotid artery; — spiral angiography revealed intravascular plaque: ischemic stroke in the fronto-temporal areas of the brain with cortex and subcortical lesions, ventricular compression and displacement the midline to the right

sent observed movement disorders by hand, and the localization of stroke in the area of the thalamus were observed oculomotor disturbances. The nature of these changes may persist long after the acute stroke

(monitoring of patients was conducted for 10, 20, 45 days and 3 months). These terms are marked cognitive impairment (loss of memory, intellect, preservation of motor disorders in varying degree, depending on the size of the stroke occurred. Some patients were impaired control of pelvic organs.

Here we should note the following, in some patients, even without a history of stroke were observed

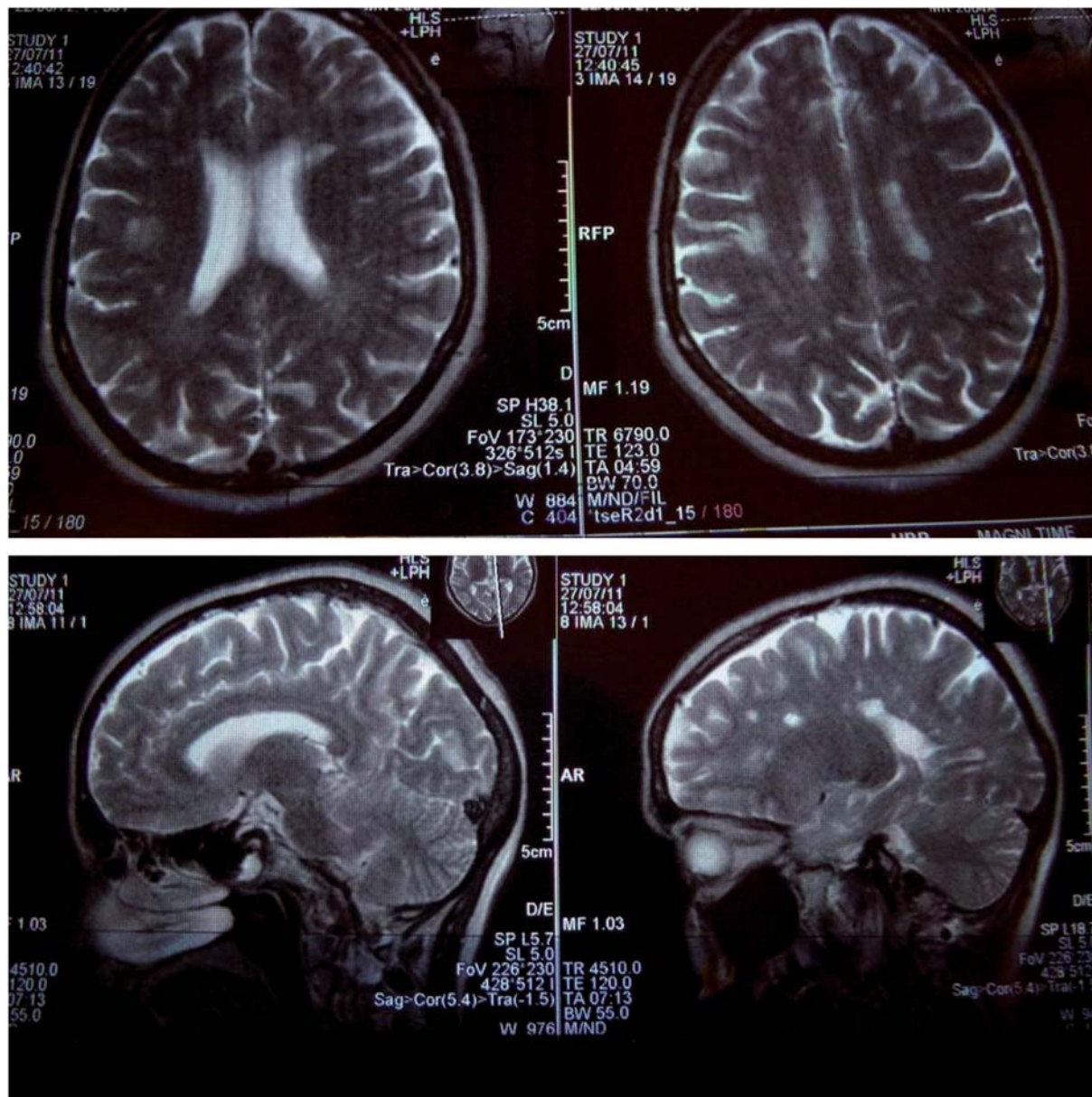


Fig. 7. MRI in T1, T2, T2 trim-weighted images in the white matter of the frontal-temporal-parietal regions of the brain, mainly in relation to the periventricular lateral ventricles, in the corpus callosum and in the pons are determined by multiple foci of various shapes and sizes with hyperintense signal at T2V1

similar symptoms of cognitive impairment (bradykinesia, gait disorders (apraxia), some pseudobulbar violations even more pronounced than in patients with stroke. During the CT and MRI we have seen the expansion of the ventricles, the expansion of subarachnoid space, in some cases even leukoencephalopathy, moderate atrophy of the anterior fronto-temporal regions of the

brain. In these cases, we have exhibited a diagnosis of atherosclerotic dyscirculatory encephalopathy.

Often lacunar infarctions on CT or MRI detected in cerebellum. Patients complained of visual and oculomotor disorders, structural analysis and coordination, vestibular disorders. When performing CT angiography of the vertebral vessels were observed in varying degrees of severity of the aneurysm, the excesses of the internal carotid outside the skull their occlusion.

CT and PT M allow us to estimate the changes in the structure of the brain with the same accuracy. Leukoencephalopathy detected by CT in 90% of cases, the expansion of the ventricles of the brain in 100%, lacunar

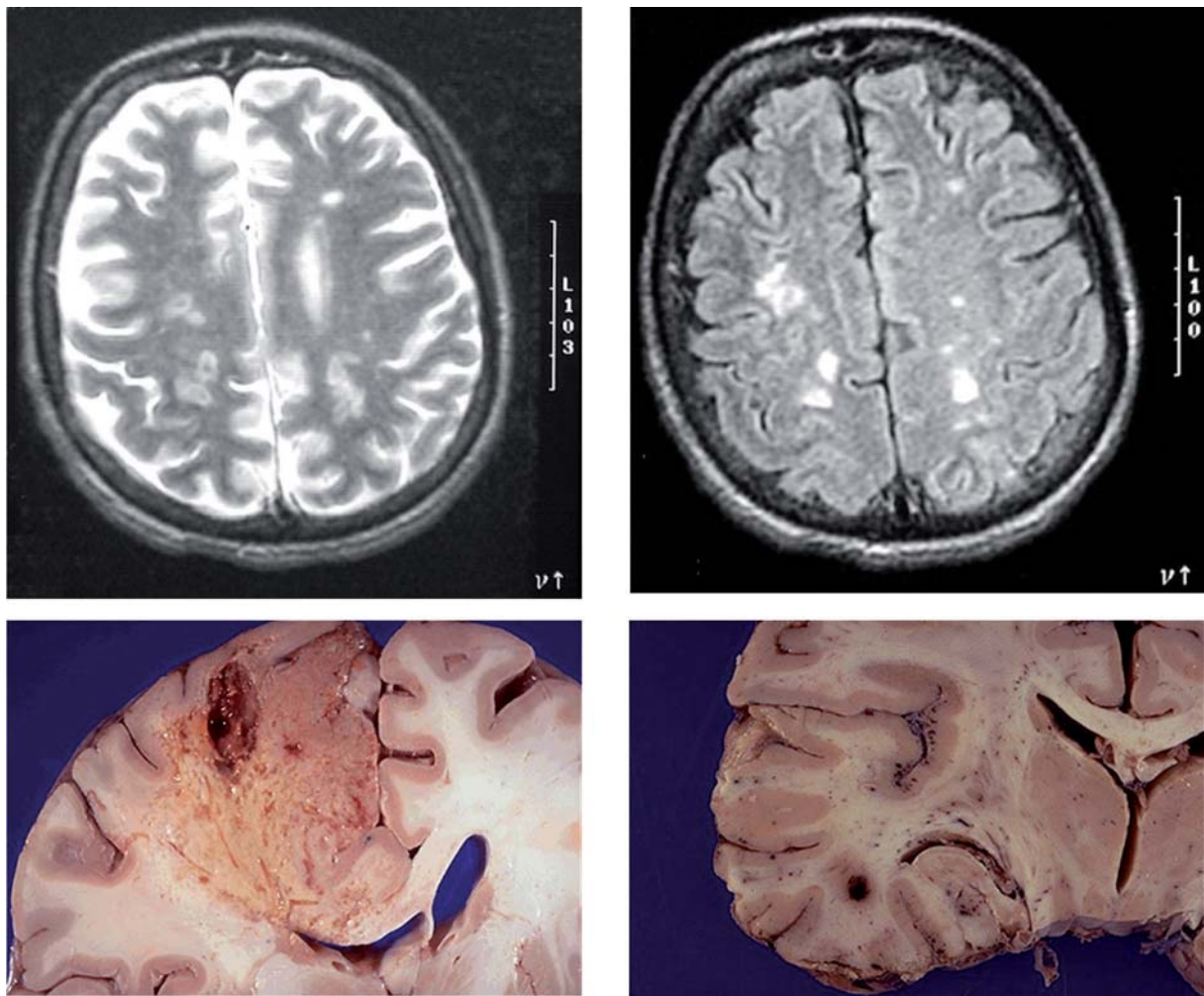


Fig. 8. CT - defined: — lacunar infarctions in the projection of the cortex and white matter of the brain; atrophy of the anterior structures, fronto-temporal lobe; — leykoareoz in periventricular regions of the brain

infarctions in 100% of cases, the nuclei of white matter damage in 100% cases. Leykoareoz MRI reveals almost all patients with vascular dementia. Changes are well detected by MRI in the structures of the hippocampus, the tonsils of the brain stem (Fig. 9–10).

SPECT, fMRI, PET showed that vascular dementia is characterized by the presence of multiple zones of hyperperfusion and asymmetrical hypometabolism.

Assessing possible methods of beam diagnostics for detection of vascular dementia, we identified the following changes:

- lacunar infarcts in the projection of the white matter of the brain;
- ventricular enlargement, atrophy of anterior structures, fronto-temporal lobe.

CONCLUSION

Multislice CT angiography is a fairly modern method in clinical practice and in the foreign medicine, this method has long been the "gold standard" in the examination of patients with vascular disease of the brain. With virtually no contraindications for the study (only idiosyncrasy of iodine-containing preparations), this method provides a very clear picture of the vascular bed, both in two-, and three-dimensional projection, to relate it to the bone structure. Revealed vascular disorders are not always accompanied by cognitive changes and their evaluation should be a whole range of additional studies (EEG, rheoencephalography, clinical research methods).

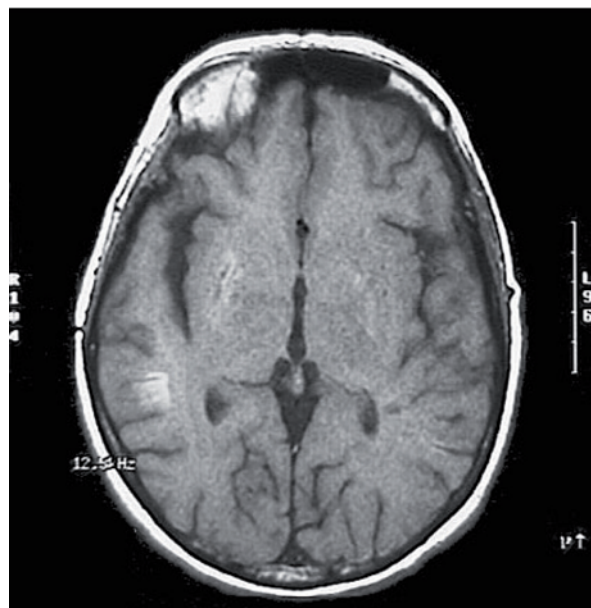


Fig. 9. MRI-defined: — Loss of differentiation between gray and white matter; — smoothness of cortical gyri; Lacunar infarcts in the shell on both sides; — reduction in the density of cortical gyri; — existence of linear bands giperdensivnyh affected thrombosis

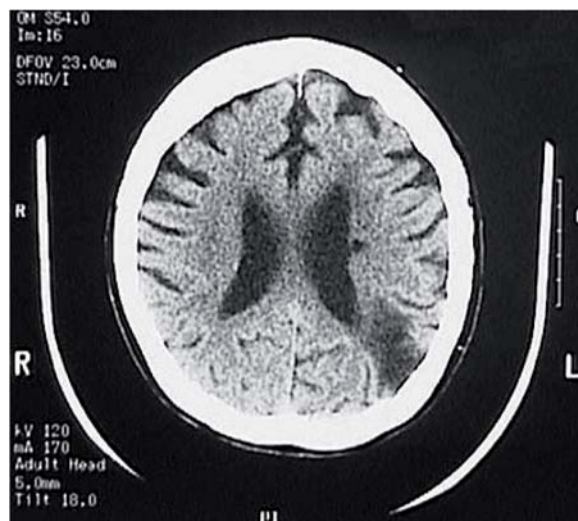


Fig. 10. Zone malacia in the localization thalamus by MOVED

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AKUTNACHSORGE UND REHABILITATION BEI ARTERIEN- UND VENENKRANKHEITEN

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ABSTRACT — Patienten mit arterieller Verschlusskrankheit (pAVK) haben eine deutlich verkürzte Lebenserwartung. 2011 wurden in Deutschland 200.000 arterielle Interventionen und 30.000 arterielle Operationen vorgenommen. Durch die Akutnachsorge (Wundversorgung, Mobilisierung, Schmerztherapie, Infektionsbehandlung, Hyperperfusionsödem) und die anschließende Rehabilitation (aktives Training, balneophysikalische Anwendungen, Vacumed, Schulungen, Hilfsmittel, Schuhversorgung) werden diese Patienten schnell und schmerzarm mobilisiert. Ihre Gesamtprognose wird verbessert. Patienten mit schwerer venöser Insuffizienz (CVI) haben eine deutlich eingeschränkte Lebensqualität. Die Vermeidung der CVI durch optimale Varizenchirurgie und richtige Thrombosebehandlung steht an 1.Stelle; die Nachsorge und Rehabilitation wird dominiert durch adäquate Kompression und angepassten Lebensstil.

DAS DEUTSCHE SYSTEM DER AKUTNACHSORGE UND REHABILITATION

Deutschland ist weltweit führend in Quantität und Qualität der Rehabilitation. Von 1,6 Millionen stationären Rehabilitationsbehandlungen 2011 in Deutschland entfallen ca 15% (240.000) auf Krankheiten des Herz-Kreislaufsystems. Die historischen Hauptaufgaben – Verbesserung chron. Behinderungen, Rekonvaleszenz nach schwerer akuter Krankheit – wurden mit Einführung der DRG-Krankenhausfinanzierung und Verkürzung der Behandlungszeit im Akutkrankenhaus erweitert um die postoperative Akutnachsorge (= blutige Verlegung): Frühe (5–6. postop.Tag) Verlegung in die Rehabilitationsklinik mit Wundbehandlung, Akutnachsorge, schneller Mobilisierung.

EPIDEMIOLOGIE PERIPHERE ARTERIELLE VERSCHLUSSKRANKHEIT (PAVK)

Ganz überwiegend führen Herzerkrankungen (koronare Herzkrankheiten, Herzklappenoperation) zur Rehabilitation, zu einem geringeren Teil pAVK (nach Bypass-OP oder Stent). Wir erkennen diese Krankheit nicht früh genug (Verhältnis asymptom/symptom = 4:1) und können die einfache Primärtherapie (ASS, Statine, Bewegung, Risikofaktoren) nicht rech-



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zeitig beginnen. Dabei liegt die 5-Jahres-Letalität der stabilen pAVK um 30% höher als der stabilen KHK. Patienten mit kritischer Ischämie eines Beines haben eine 3 Jahresletalität von 55% - die meisten Krebserkrankungen haben eine bessere Prognose. Dabei sind Gefäßtrainingsprogramme sehr effektiv, eine Rehabilitation nach Arterienbypass oder Stent verbessert die Prognose.

In Deutschland werden 60.000 Amputation pro Jahr durchgeführt.

APPARATIVE DIAGNOSTIK (PAVK)

Screening: Ankle-Brachial-Index (ABI) = Ratio Oberarm-: Unterschenkelblutdruck (Doppler)

ABI Kleiner 0,9: pAVK
kleiner 0,5: kritische Ischämie
Größer 1,3: Mediasklerose

Nichtinvasive Gefäßdarstellung mit Duplex:
(Ultraschall mit CW-Doppler und Farbcodierung).
Eingeschränkte Aussagekraft bei Arterienwand-Verka-
lungen und generell im Abdomen.

Invasive Gefäßdarstellung mit Röntgen – Ak-
tuell empfohlene Reihenfolge:

1. MR-Angio mit iv.Kontrastmittel: 25 min. Dauer, Laut, beengte Untersuchung
2. Ct-Angio mit iv.Kontrastmittel: 20 Sek. Dauer, Strahlenbelastung
3. DSA mit ia. Kontrastmittel in Interventionsbereitschaft (PTA ggf. mit Stent)

INTERVENTIONEN (PAVK)

200.000 Interventionen in Deutschland im Jahr 2011, v.a. A. fem. superficialis und A. poplitea.

Technik: antegrade oder retrograde Punktion, Ver-

schlüsse im wahren oder falschen (subintimal) Lumen rekanalisieren, Stent ab Verschlusslänge von 5 cm sinnvoll, Operation ab Verschlusslänge 15 cm überlegen. Problemzonen sind Leiste und Knie wegen Beugung, 30%-Reststenose nach Intervention führt schneller zu einem Re-Verschluss. Medikamente freisetzende Stents (Paclitaxel, Silber) steigern 1-Jahr-Offenheitsrate deutlich.

OPERATION (PAVK)

30.000 Operationen im Jahr 2011 in Deutschland (rückläufig) mit zunehmenden Hybrideingriffen (bis 30%). Häufigste OP ist femoropoplitealer Bypass, hier muss Venenmaterial (Vena saphena magna statt PTFE/Dacron) wegen besserer Offenheitsrate verwendet werden (Forderung Gefäßchirurgie). Die Offenheitsrate der Bypässe oberhalb Knie muss nach 5 Jahren über 75% betragen!!!

Bei stabiler Claudicatio, verschlossener A.fem. superficialis und gutem Einstrom via A.fem.com. + A. fem. prof. sollte der femoropopliteale Bypass die Ausnahme bleiben (ggf. Profundaplastik), da hier ein idealer Trainingstyp vorliegt.

AKUTNACHSORGE (PAVK)

Wundversorgung:

Standardisiert (zertifiziert vom Wundzentrum Hamburg) führen wir in 3 Behandlungszimmern feuchte (physiologische) Wundversorgung bei ca. 2400 Patienten/Jahr durch. Ziele der feuchten Wundbehandlung: Beschleunigung der Heilung, schmerzarme seltene Verbandwechsel (2xWoche), geringeres Narbengewebe, schnelle Mobilisierung, Kostenreduktion.

Bei sekundärer Wundheilung muss beachtet werden:

- Ernährung: Eiweiß: 1,0–1,5g/kg Körpergewicht, Vitamin A, C, E, Zink, Selen, Arginin;
- Allgemeinzustand + Immunstatus des Patienten, Zeichen einer Infektion;
- Durchblutungssituation, bei klinischer Auffälligkeit apparative Untersuchung;
- Wundtemperatur 30–32 Grad, Abkühlung durch häufige Verbandwechsel vermeiden;
- Optimale Feuchtigkeit der Wunde durch richtiges Material (Sekretmanagement);
- Der zu mobilisierenden Patient muss Wunde ruhigstellen (Knie/Sprunggelenk/Leiste);
- Schlecht eingestellter oder langjähriger Diabetes erhöht Risiko für Wundheilungsstörung;
- Überprüfung Medikamente.

Ausnahme: Trockene Wundbehandlung bei Gangrän, periphere Nekrosen

Hier ist feuchte Wundbehandlung kontraindiziert. Nur wasserdampfdurchlässige Wundabdeckung, Schutz vor Druck und Verletzung, Trockene Mummifikation, Grenzzonenamputation.

Mobilisierung

Trainingsprogramm (analog Rehabilitation siehe unten) in Einzel- und Gruppenanwendungen, angepasst an das postoperative Leistungsvermögen. Vermindert Immobilisationsfolgen wie Thrombosen, Lungenembolien, muskuläre Schwäche, Ödeme

Schmerztherapie

Übliches medikamentöses Stufenschema plus nichtmedikamentöse Beeinflussung: Elektrophorese (Tens-Gerät), Massagen, Balneotherapie,

Postoperative Infektionen

Entzündungen der Atem- und Harnwege. Abnahme von Blutkulturen, gezielte Antibiotikagabe und Begleittherapie: Inhalieren, Atemgymnastik, Vibrax, saures Urin-Milieu,

(Hyperperfusions)Ödem

Häufig bei kräftig fördernden art. Bypässen (Fempop als in situ Vena-saphena-magna-Bypass wegen der Arterialisierung oberflächlicher Venen), schwierig zu behandeln, da Kompression kontraindiziert (Vena saphena magna verläuft oberflächlich und hat leicht komprimierbare Wand). Bein hochlagern (auch nachts auf Kissen), mehrfach täglich kalt abduschen. Bei massiver Ausprägung Revisions-OP (Unterbindung von per Duplex zu ortenden AV-Fisteln, Einengung der prox. Anastomose)

Postoperative Verlaufskontrolle: klinische und apparative Kontrolluntersuchungen (ABI, Duplex) zur Darstellung des Bypasses und des Blutflusses in der jeweiligen Extremität.

REHABILITATION (PAVK)

Basismedikation:

ASS, Statine, ggf. iv (ia). Prostaglandine. Oral ggf. Pletal.

Aktive Therapieverfahren:

Gymnastik: Rückengymnastik, Einzelkrankengymnastik (Mobilisierung, orthopädisch, neurologisch), Atemgymnastik (Gruppe und Einzel), arterielle Gefäßgymnastik, venöse Gefäßgymnastik, Warmwassergymnastik, Wassertreten, medizinische Trainingstherapie an Geräten, (orthopädisch, Kraft, Ausdauer, neurologisch), Gangschulung, Rollstuhl- und Prothesentraining, Ergotherapie

Ausdauertraining: Schnelles Gehen (Gruppen- und Einzel), Fahrradergometer (Gruppen- und Einzel), Laufbandtraining, Schwimmen,

Passive Therapieformen

Inhalationen mit Sole, Mucolyticum, Kamille und Vibrax (maschinelle Klopfmassage Brustkorb)

Wasseranwendungen: Wechselbäder der Arme/Beine, Kneippsche Güsse, Ansteigende Bäder der Arme/Beine, Medizinische Bäder (Voll, Halb, Teil, Sitz) mit O₂, CO₂, sedierend, Rheuma, Öl

Trockenmassagen (Stamm, Extremitäten) und Unterwassermassage

Manuelle Lymphdrainage

Wärmeverfahren: Fangopackungen (Stamm und Extremitäten), Rotlicht, Heißluft, Mikrowelle

Elektrotherapie: Stangerbad, Reizstrom, Vierzeilenbad,

Gehtraining:

Aktives Muskeltraining fördert die arterielle Durchblutung und auch die Bildung von Kollateralen. Sie ist die entscheidende Maßnahme!! Bei Gehbehinderung durch orthopädische/neurologische Begleiterkrankungen bieten wir Ergometer, Motomed, Wadenmuskeltraining im Sitzen, medizinische Trainingstherapie, Stepper, Gehen im Schwimmbad.

Intermittierende Unterdruckbehandlung (Vacumed):

Nach Ergebnissen der NASA (Gerät wurde für Langzeit-Aufenthalt im Weltraum entwickelt) zeigt sich eine Kapillardilatation und verstärkte Kapillarisation. Apparativ messen wir Erhöhung des cutanen Sauerstoffpartialdruck im Zehenbereich und der akralen Pulswelle. Die Patienten berichten, unmittelbar nach der Behandlung eine längere schmerzfreie Gehstrecke zu haben – dies ist eine ideale Trainingsmotivation. Die Vacumed-Behandlung vermindert bei venöse Ödeme, sie ist kontraindiziert bei lymphatischen Ödemen.

Schulungsprogramm:

Neben der ärztlichen Beratung und der (soweit möglich) medikamentösen Behandlung der Risikofaktoren durchlaufen die Patienten auch ein Schulungsprogramm:

Ernährungsberatung, psychologische Einzelberatung, autogenes Training, Raucherentwöhnung, Diabetesschulung, Coagu-Check-Kurs zur Selbstmessung des Quick/INR, Blutdruckselbstmessung, Selbstmessung der Lungenfunktion, Wunschgewichtskurs, cholesterinarme Ernährung.

Es werden auch Vorträge zur pAVK, zu allen Risikofaktoren und der Therapie des Bluthochdruck angeboten.

Begleiterkrankungen

pAVK-Patienten sind meist über 60 Jahre alt und zeigen häufiger degenerative Wirbelsäulenerkrankungen, Bandscheibenschäden und Gelenkerkrankungen. Die Mitbehandlung dieser Begleiterkrankung ist für die erfolgreiche Mobilisierung oft notwendig.

Hilfsmittel/Schuhversorgung

Bei neurologischen Begleiterkrankungen sind häufig Orthesen (z.B. Peronausschienen) erforderlich. Günstig ist auch die Versorgung mit der richtigen Gehstütze: (Rollator, Gehstock, Vier-punktstock). Die Schuhversorgung beginnt mit der Beratung für den nicht drückenden, abroll-freundlichen Konfektionsschuh bis zur orthopädischen Schuhversorgung bei Fußdeformitäten und dem diabetischen Schuh bei diabetischer Polyneuropathie oder (drohender) Gangrän.

VENEN

17% der Deutschen leiden an chron. Venöser Insuffizienz (CVI)

Eine wesentliche Ursache der CVI, die familiär gehäufte Varicosis mit ihren unterschiedlichen Ausprägungen, wird in Deutschland 350.000 mal im Jahr operiert. Bei richtiger Indikation und Technik wird sich keine CVI ausbilden – falls nicht andere (zusätzliche) Ursachen für eine CVI bestehen, wie eine Insuffizienz der tiefen Beinvenen oder eine ungenügende OP-Technik.

Eine weitere häufige Ursache der CVI ist das postthrombotische Syndrom. Ganz entscheidend ist hier die frühzeitige Erkennung der tiefen Beinvenenthrombose mit adäquater Behandlung und anschließender effektiver Kompressionstherapie. Langfristig ist bei anhaltenden Beschwerden auch ein angepasster Lebensstil und die Beseitigung von Übergewicht notwendig.

AKUT-THERAPIE BEINVENENTHROMBOSE

Sofortige Kompressionsbehandlung einleiten und Effekt kontrollieren.

Niedermol. Heparine s.c. oder unfrakt. Heparin i.v. oder Fondaparinux. Ausnahme: Bei Unterschenkelvenenthrombose nur Kontrolluntersuchung + Gehen, keine Antikoagulation.

Ambulante Therapie (Gefahr Lungenembolie aufklären), keine Bettruhe mehr!!

Frühzeitig mit Vitamin-K-Antagonist beginnen oder niedermol. Heparine (1/2 Volldosis ab 10.Tag); die Dauer der Antikoagulation beträgt 3–6 Monate, eine längere Antikoagulation ist erforderlich bei Nachweis einer Gerinnungsstörung, familiärer Häufung, zweiter Thrombose, Krebsgenese

REHABILITATION DER CHRON. VENÖSEN INSUFFIZIENZ

Abschwellen des Beines:

Lymphdrainage, manuelle und/oder maschinelle Kompression, Bandagen, später angepasste Kompressionsstrümpfe der Kompressionsklasse 2 oder 3. Die Höhe der Kompression (bis zum Knie, bis zur Leiste) ist abhängig vom Duplex. Die Effektivität der Kompression kann der Pat. durch Selbstmessung des Knöchelumfangs morgens/abends kontrollieren, ggf. mit dem gesunden Bein vergleichen.

Venöses Ulcus:

Verstärkung der Kompression z.B. Einbau eines Kompressionskissens in Höhe des Ulcus, intensive manuelle Lymphdrainage oder maschinelle Kompression. Feuchte Wundbehandlung (wie oben) mit nichtklebenden Wundauflagen. Unterstützend Vacumed.

Venengymnastik =

Übungen mit Betätigung der Wadenpumpe, kann auch im Sitzen durchgeführt werden. Wichtig ist ein mobiles, gut bewegliches Sprunggelenk.

INR-Selbstmessung

(Coagu-Check-Kurs) für Patienten mit voraussichtlicher langer (lebenslang) Antikoagulation. Deutlich bessere Einstellung als hausärztliche INR-Einstellung. Häufigere Kontrolle in besonderen Situationen, wie zusätzliche Antibiotika-Einnahme, interkurrenter Durchfall, möglich. Auch längere Urlaubsreisen werden erleichtert.

Gewichtsreduktion:

Übergewicht erschwert erheblich den venösen Abstrom. (Es gibt auch Unterschenkel-Ödeme nur infolge Übergewicht!!)

Verhaltensschulung (kein längeres Stehen, kein längeres Sitzen mit herabhängenden Beinen). Berufliche Wiedereingliederung: Bei schwerer CVI wird in Deutschland der Arbeitsplatz angepasst oder eine innerbetriebliche Umsetzung vorgenommen.

METABOLIC STATUS OF ERYTHROCYTES AT PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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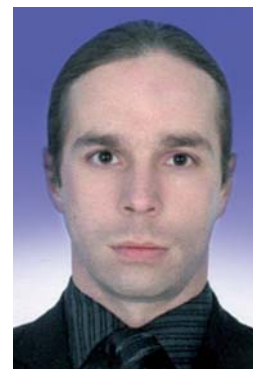
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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is one of the major medical problems throughout the world. It is predicted that in 2020 COPD will become the third leading cause of death worldwide [1, 2]. COPD is considered such as systemic disease, but the mechanisms of its development are not clear.

One of the mechanisms of COPD development has associated with red blood cells (RBCs) disorders. Oxidative stress and reduced antioxidant resources in RBCs of COPD patients may contribute to the systemic effects of COPD [3]. It is considered that oxidative damage of RBCs induced an impairment of rheological properties of erythrocytes by means of increasing of lipid peroxidation, fragmentation of membrane proteins, decrease of membrane – binding enzyme activities and disorder of barrier function of membrane [4,5,6]. The RBCs of COPD patients were altered with respect to control erythrocytes. It was revealed important shape changes and increase in membrane rigidity. The data seem to suggest that changes in erythrocyte shape and rheological properties play a key role in RBCs dysfunction in the progression of COPD [6]. Recently it was found the conversion of hemoglobin in erythrocytes of COPD patients. The results obtained showed increment of the concentration of methhemoglobin, sulphemoglobin, fetal hemoglobin and glycosylated hemoglobin in RBCs of COPD patients [7].

The aim of the present work was to apply biochemical analysis to detect metabolic perturbations in erythrocytes of patients with different clinical forms and severity of COPD.

ETHICS

This investigation was approved by the ethics committee of Karaganda State Medical University. All patients and healthy subjects had received the full information on probable inconveniences and complications at the blood sampling before giving their written informed consent.

PATIENTS AND PROCEDURES

Control subjects were healthy volunteers without any medication. All patients were on hospitalization and inspection. The syndrome of bronchial obstruction has been revealed at 100 percent of patients at receipt in a hospital. Respiratory insufficiency (RI) was established in reason of the syndrome of short wind in a rest condition and at the insignificant physical loading representing walking on 100 meters by slow rate (speed of movement is not higher than 5 steps in one minute). RI of I degrees is diagnosed at 25% of patients and RI of II degrees — at 75 % of patients. Verification of the diagnosis was carried out on the basis of the complex of the standard criteria. At 100 percent of patients the habit to smoking tobacco is revealed. The index of smoking person has made > 200 at 67% of patients of 1st group and at 73% of the patients including in 2nd group. In 45% of patients are marked professional harm (the experience of underground work on collieries over 10 years, work on woodworking enterprises, cement works), atmospheric pollution (inhabitants of Kazakhstan industrial cities Temirtau, Karaganda, Balkhash have made 79% surveyed).

Basic clinical displays of COPD were cough with sputum and a short wind. Cough was marked during all

day, less often only at night. The quantity of sputum was small, outside of aggravations its character was mucous. At 54% of patients elimination of sputum was occurring after long cough. All patients carried out cytologic research of sputum which found out presence of alveolar epithelial cells, elastic fibres, siderophages. It was found out a plenty of the leukocytes submitted basically neutrophils at 54% of patients of 1 group and at 61% of patients of 2 groups during an aggravation. It was interpreted as the evidence of pyo-inflammatory process in mucous of bronchial tree.

Patients were divided into 4 groups. 29 patients with COPD, moderate severity mixed form (emphysematous and bronchial), exacerbation, respiratory insufficiency of grade 2 were included in first group. 21 patients with COPD, severity mixed form (emphysematous and bronchial), exacerbation, respiratory insufficiency of grade 2 were included in second group. 35 patients with COPD, moderate severity bronchial form, exacerbation, respiratory insufficiency of grade 2 were included in 3rd group. 23 patients with COPD, severity bronchial form, exacerbation, respiratory insufficiency of grade 2 were included in 4th group. The fifth group consisted of 32 healthy subjects.

Venous blood (3.0 ml) was drawn from patients and healthy ones into a heparinized syringe; blood was centrifuged (2000 g, 10 min, 4° C). The plasma and buffy coat were removed. The erythrocytes were washed (3×) in ice-cold phosphate buffered saline with following centrifugation (2000 g, 10 min, 4° C).

METHODS

The count of erythrocytes and hemoglobin were detected by using Mindray BC-3200 Hematology Analyzer. The concentration of malondialdehyde (MDA) was measured using thiobarbituric acid [8]. The concentration of MDA was given in mmol/g. The protein reactive carbonyl derivatives protocol of Levine R., et al. [9]. The protein reactive carbonyl derivatives content values were given in nmol/g hemoglobin. Sorption property of RBCs was measured using methylene blue (MB+), unit - %. High erythrocyte membrane permeability was associated with increased methylene blue sorption, which correlated with erythrocyte damage [10]. Determination of glycosylated hemoglobin (HbA1c) was performed using sets of Hemoglobin A1C company BioSystems, unit - % HbA1c.

Statistical analysis. Comparisons between patients and controls ones were performed using non-parametric Mann-Whitney U-test (for independent variables) and Wilcoxon matched pairs test.

RESULTS

The results obtained demonstrated the significant increasing of MDA and protein reactive carbonyl

derivates in RBCs of COPD patients ($p < 0.001$). It was found that MDA accumulation in erythrocytes did not depend on severity and clinical form of COPD. The concentration of protein reactive carbonyl derivatives was higher in erythrocytes of patients with COPD of severity bronchial form in comparison with patients suffering of COPD of moderate severity bronchial form (Table 1).

An increasing of the glycated hemoglobin concentrations (above 6%) was fixed in erythrocytes at 9% of the 1 group patients and at 25% of the second group patients. An increasing of the glycated hemoglobin concentrations were fixed in erythrocytes of 29% of the 3 group patients and at 37 % of the 4th group patients.

Analysis of MB+ sorption on RBCs from 1-4 group patients showed the significant differences in respect of control ones. Sorption properties of RBCs from patients of 1 and 2 groups were higher than control one (by 2 and 1.8 times, respectively, $p \leq 0.001$). Sorption properties of RBCs from patients of 3 and 4 groups were higher than control one by 1.5 times ($p \leq 0.001$). In our opinion it would be better interpret those results not from position of erythrocyte membrane permeability. It is known that MB+ acts as an electron donor in the non-enzymatic reduction of methemoglobin [11, 12, 13]. NADPH-dependent reductase catalyses the reduction of methylene blue to leucomethylene blue [11]. We supposed that high sorption properties of RBCs in patients from 1 and 2 groups might be connected with low reductase activity. The trend to declining of sorption properties of RBCs in patients from 3 and 4 groups might be determined by slight increasing of reductase activity. In any cases it may be at higher risk for developing methemoglobinemia. Our data agree well with studies that have found methemoglobin reductase (CYB5R3) to be underexpressed in erythrocytes at COPD patients [14].

Taken together, our results obtained demonstrated the synchronism of lipid peroxidation and accumulation of oxidative-modified proteins in RBCs of COPD patients. In our opinion the hemoglobin and cytoskeleton proteins are the main intracellular targets for carbonyl stress. Oxidative modification of intracellular proteins induced on different perturbations of erythrocyte metabolic pathways. The oxidative modification in lipid and protein components of RBCs plasma membrane erythrocytes of COPD patients may decrease the membrane fluidity and carrier properties. It also may possibly impair the activity of membrane-binding enzymes.

We believe that would be expedient to continue discussion of our results in a context of studying of mechanisms of progressing COPD.

Table 1. The concentration of protein reactive carbonyl derivatives and MDA in erythrocytes of patients with different clinical forms and severity of COPD

Groups	Protein reactive carbonyl derivatives	MDA
	median	median
Control subjects	7,91	0,51
Std.Dev.	1,63	0,025170
Group 1	13,56*	0,92*
Std.Dev.	6,01	0,399549
Group 2	12,15*	0,87*
Std.Dev.	3,50	0,123491
Group 3	14,72*	0,90*
Std.Dev.	5,82	0,303187
Group 4	15,12*	0,81*
Std.Dev.	4,88	0,388738

* Significant difference compared to control ones ($p \leq 0,001$)

FUTURE DIRECTIONS

The further challenge will be to expand analyzing physical and chemical properties of RBCs in blood of patients at different stages and types of COPD and to estimate their impact in progression of COPD.

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COMPETING INTERESTS

The authors declare that they have no competing interests. All authors read and approved the final manuscript.

COAGULATION AND ANTICOAGULATION SYSTEM OF BLOOD IN NEWBORNS WITH MALFORMATIONS IN COMMUNICATION WITH ANESTHESIA AND SURGICAL INTERVENTIONS

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ABSTRACT — The article presents data on the state of coagulation and anticoagulation systems of blood in newborn with developmental disabilities, in connection with anesthesia and surgical intervention.

KEYWORDS — the system collapse, newborn babies, anesthetic injury

Coagulation and anticoagulation system of blood is a sensitive indicator of adaptation — adaptive reactions forming the main component of homeostasis. Depending on various factors, internal and external environment it is exposed to constant changes.

Clotting reaction itself, like many biological and chemical reactions, is a chain reaction: the individual links clotting process are mutually connected with each other. In the blood of a violation of a dynamic equilibrium between coagulation factors and inhibitors may be a trigger for thrombosis. The mechanism of blood coagulation plays a significant role autocatalytic process. Autocatalysis throughout the complex dynamics of the clotting process is the enzyme thrombin. The more forms of thrombin, the more there is to accelerate the formation conditions of thrombin and thereby increases the possibility of intravascular coagulation.

Coagulation system has a high degree of self-regulation. Physiological balance between the numerous clotting factors, the presence of buffer systems of blood leads to the fact that the balance is maintained to help prevent blood clots in the circulatory system and at the same time providing bleeding in vascular lesions. (0,2)

Modern multi anesthesia and extensive, traumatic surgery cause profound changes in the coagulation and anticoagulation blood system, resulting in an operating period of the dangers of thrombosis and embolism. Therefore, it is important to recognize the development of phenomena prethrombosis. According to the literature on the blood coagulation system is subject to change character of the age.

State of blood coagulation during surgical intervention in children remains almost unexplored. Remain unknown rate of blood coagulation indicators in children at different ages, although they exist (3, 4).

MATERIALS AND METHOD OF RESEARCH

A study of indicators of coagulation system 107 infants with developmental disabilities received in the Department of Anesthesiology, Intensive Care National Medical Center in RT from 2005–2010. Studies were performed before surgery, during it and in the postoperative period.

In the study of coagulation factors in newborns during the first day of birth there is a low concentration of fibrinogen, whereas prothrombin complex is somewhat higher than that of newborn received a 10–15 days from birth. Tolerance to heparin plasma increased in children by 20–25 days from birth. They also noted a decrease in fibrinolytic activity, expressed in percent decrease in the spontaneous lysis of up to $11.2 \pm 1.2\%$ (at a rate of 14–15%).

THE RESEARCH RESULTS

Pathological processes in the lung, kidney and urinary tract have an influence on blood coagulation, taking an active part in the synthesis and utilization of coagulation factors, and fibrinolytic systems of blood (1, 3, 4, 5).

In the study of blood coagulation factors in infants with anal atresia without fistula (25) was detected in the preoperative period, a significant increase in plasma tolerance to heparin at low levels of plasma fibrinogen. In infants with anorectal malformations fistulous form (33) found the phenomenon anticoagulation: decrease in prothrombin index. Lengthening the time of recalcification of the plasma.

In infants with congenital intestinal obstruction index decreased prothrombin, increased tolerance to heparin plasma and reduced fibrinolytic activity.

Thus, studies of blood coagulation parameters in newborns with congenital malformations found some of the features of blood coagulation, which may cause bleeding complications during surgery and thromboembolic complications in the postoperative period,

which should be taken into account when preparing for surgery.

The factors of blood coagulation in surgical interventions for endotracheal anesthesia combined (33), central analgesics (30), epidural analgesia on the background (44).

When combined epidural anesthesia on the background of analgesia, we found the state of anticoagulation, which is expressed in the reduction of the prothrombin index trombotesta, fibrinogen, plasma recalcification time extension and the sharp rise in blood fibrinolytic activity. The revealed changes particularly pronounced in infants aged 10–15 days, less severe in children 20–25 days.

When combined endotracheal anesthesia occurred summed effects of drugs (barbiturates, muscle relaxants), blood transfusion during surgery, as well as extensive tissue trauma with the release of large amounts of tissue thromboplastin, affecting the coagulation process. Under these conditions, changes procoagulants are compensated in nature: with an increase in prothrombin observed decrease in fibrinogen, fibrinolytic system of blood, several activating the beginning, rises sharply at the end of the operation (200%). Retraction decreased ability of blood at the beginning and the end of surgery.

Investigation of the blood coagulation system in newborns with surgical interventions by the central analgesic effects of hypercoagulation notes, growing by the end of manipulation. This is evidenced by: a shortening of AVC. (At baseline, equal to 160 ± 0.7 , a decline to 129 ± 9 seconds in the beginning and up to 114 ± 10.8 seconds by the end of the operation), the increase in coagulation index of 4 ± 0.2 to 6.6 ± 0.4 by the end of the operation.

Thus, the study of coagulation parameters during the pain of various surgical interventions reveal a variety of changes on the part of the system depending on the type of anesthesia, and the severity of surgical intervention. Changes in the coagulation system due to complex nerve-reflex, endocrine-humoral shifts associated operative trauma and anesthesia.

In the central analgesic analgesics changes in blood coagulation system are compensated more than character. Thus, when surgical intervention indicated moderate hypercoagulability, manifested in increased procoagulants (prothrombin, fibrinogen), more pronounced at 25–28 days from birth. All infants with procoagulants increase observed increased fibrinolytic activity. This played an important role in maintaining the balance between coagulation and anticoagulation systems of blood.

Epidural analgesia on the background of combined anesthesia was used in infants and young

children with anorectal malformations. These children have noted before surgery significantly reduced procoagulants and inhibition of fibrinolysis process, which is associated with symptoms of chronic fecal intoxication. Under these conditions during treatment with epidural analgesia with combined anesthesia occurred a significant increase in procoagulants, increased rates of general coagulation (trombotest, plasma recalcification time). Fibrinolytic activity of blood did not undergo drastic changes.

The main role in reducing blood coagulation factors during anesthesia belongs to dysfunction of the liver, where the synthesis of many factors, blood coagulation. There are factors that stimulate the action of drugs on the fibrinolytic activity of blood, this increase in calcium concentration and its inhibitory effect on the activity of free heparin blood. But the main application of anesthesia is a central nervous system and especially the reticular formation. By changing the functional state of central nervous system. Anesthesia affects both the activity and the ratio of coagulation and anticoagulation system of blood, which are regulated by the nervous system (1, 3, 5). Increased blood fibrinolytic activity is a compensatory response of the body, aimed at preventing and eliminating the effects of intravascular coagulation.

The state of blood coagulation in the postoperative period was carried out in dynamics: by the end of the first day, at 3 and 5 days after surgery. Infants with severe operations received postoperative analgesia in the first 2–5 days. Shifts of the coagulation system depended on the nature of the main anesthetic during surgery, type of analgesia therapy, severity of surgery.

By the end of the first day after surgery under endotracheal anesthesia, surgical intervention for severe tendency to reduce the degree of trombotesta and prothrombin index, fibrinogen, prolongation of recalcification time, other factors remain at the previous stage study (the end of surgery). On the third and fifth postoperative day in all groups of patients examined there was a significant increase in blood coagulation activity, level of activity which depended on the severity of surgical trauma, type of anesthesia. Postoperative analgesia contributed to medical compensation increased content of paracoagulants due process of fibrinolysis.

For leveling of the pain (4 and 5 days) to the fore the severity of surgical trauma and age-specific blood coagulation. All babies, regardless of surgical trauma there was a marked elevation in blood coagulation, fibrinolytic system activation. On the seventh day after surgery, blood coagulation system tends to return to its original level only some parameters of coagulation (prothrombin index, clot of blood).

CONCLUSION

1. Newborn and young children age to surgery under endotracheal anesthesia, central analgesia, epidural analgesia in the postoperative period observed increase in activity and paracoagulants general coagulation system.
2. Depression of fibrinolytic activity and system paracoagulants indicates hypercoagulability. This state begins at the end of the first day, and will return to the original after the operation begins on the fifth day.
3. Complex nerve-reflex (operating and anesthetic trauma), humoral factors, receipt of various products of the wound chamber tissue decay are the cause of hypercoagulability in the postoperative period.
4. Postoperative analgesia for physiotherapy 2–5 days have a stimulating effect on blood clotting.
5. Lowering blood fibrinolytic activity in the postoperative period due to a temporary depression of physiological anticoagulation blood system.

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KIDNEY FAILURE IN CHILDREN IN CRITICAL CONDITIONS AND THEIR DIAGNOSTICS

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THE RELEVANCE OF THE STUDY

Timely diagnosis of kidney disease in children, the purpose of rational therapy, conducting rehabilitation measures can prevent the development of serious complications, including acute renal failure [1, 2].

Currently widely used highly informative methods for laboratory, ultrasound, x-ray, radioisotope and immunological methods [4, 5]. However, in practice it is very important for a child holding only studies that are necessary for the diagnosis and differential diagnosis with other diseases [3, 6].

We use modern methods for diagnosis, differential diagnosis and proper selection of treatment depending on the condition of children with ARF.

THE PURPOSE OF THE STUDY

Optimization methods of diagnosis in children with acute renal failure in critical conditions based on the proper selection of optimal therapy.

MATERIALS AND METHODS

We have analyzed the results of diagnosis and treatment of 144 children with acute renal failure admitted to the Department of Anesthesiology, Intensive Care National Medical Center of the Republic of Tajikistan, and the city hospital pediatric surgery.

The main groups of patients studied were boys 60.4%. The patients received standard clinical, laboratory and instrumental methods of examination. In the analysis of laboratory data on admission of patients to the hospital, before and after the operation of extracorporeal detoxification. The condition of patients at admission was evaluated on a scale of severity APACHE 2. With the development of systemic hypotension with SBP less than 70 mm Hg. patients received the study and quantitative chemical composition of urine (urea, creatinine, sodium, potassium, β 2-microglobulin).

Multicomponent noninvasive monitoring of the patient included the dynamic monitoring of central hemodynamics, the balance of the water sector. To assess the state of central hemodynamics and water sectors to use the hardware-software complex «Dia-



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mond-R», which was used to bioimpedance spectroscopy (by Tishchenko M.I.) done before treatment, and daily during the whole duration of renal replacement therapy.

Acid-base status and blood gases were determined apparatus ABL-300 (Radiometer, Denmark). Indicators of oxygen delivery and consumption were calculated by the formula (Zolotokrylina ES, 1997):

$$\text{DO}_2 (\text{ml/min} \cdot \text{m}^2) = \text{CI} (\text{ml/min} \cdot \text{m}^2) \cdot \text{CaO}_2 (\text{g/l}) / 1000 (\text{normal } 550\text{--}680 \text{ ml/min} \cdot \text{m}^2).$$

Oxygen consumption (VO_2 , ml/min.) is given by:

$$\text{VO}_2 (\text{ml/min} \cdot \text{m}^2) = \text{AVR CO}_2 (\text{g/L}) \cdot \text{SR} (\text{ml/min} \cdot \text{m}^2) / 1000 (\text{norm. } 115\text{--}165 \text{ ml/min.})$$

AVR where CO_2 — arteriovenous oxygen content difference.

Oxygen extraction coefficient (CEC %) considered by the formula:

$$\text{CEC} (\%) = \text{AVR CO}_2 (\text{g/l}) / \text{CaO}_2 (\text{g/L}) \cdot 100 (\text{normal } 26\text{--}34\%)$$

In order to control the thermal balance during hemodialysis using an additional module TMV apparatus «artificial kidney» Fresenius 4008 H, which allows us to estimate the temperature of the blood leaving and entering highway vehicle «artificial kidney», and the total energy loss during hemodialysis (in kJ). The same unit was used to estimate the proportion of recycling in the extracorporeal circuit thermodilution method.

RESULTS AND DISCUSSION

According to the study, we identified the following options for acute renal failure.

Prerenal mechanism (septic shock, cardiogenic shock, hypovolemia) is set at 79 (55%) patients. Of these, against septic shock, peritonitis — 25 patients, cardiogenic shock — 7 patients and hypovolemia — 23 and neuroinfection — 24 patients. In patients with severe condition effects of endogenous intoxication III degree, and severe disorders of the peripheral microcirculation. From the laboratory data severe anemia in 28 patients (50.9%), hemoglobin — 7.8 g/l, erythrocytes — $2,6 \cdot 10^{12}/L$, creatinine — 1.8–2.2 mg/dl, urea — 8.1 mmol/L, from blood biochemical parameters: bilirubin — 22,1 mmol/L, ALT — 1.4 units, AST — 1.9 units.

In patients with severe hemodynamic (31) breathing ventilator was held from 1 to 5 days.

Against the background of a complex of intensive treatment (detoxification, enterosorption, metabolic care, timely surgical procedures) with prerenal acute renal failure, mortality was reduced to 24% (79 patients died 19).

Renal failure (an allergic reaction to medication drugs damaged parenchyma infection, renal bloc uretero- and nephrolithiasis, causing inside the tubular obstruction). When renal ARF, which consisted of 36 patients, 16 — heavy medication poisoning, 11 — intestinal infections and in 9 patients during nephrolithiasis and complications of acute renal failure.

Satisfactory results have been obtained as a result of complex intensive therapy, detoxification methods, under the supervision of laboratory parameters were observed in the majority of patients, 6 deaths (16.7%) from 36.

In cases of post renal damage, acute renal failure was observed in 29 patients. On the background of the urolithiasis and its complications, conducted and infusion-transfusion therapy in order to perform preoperative and surgical intervention. When a terminal state in 5 cases puncture nephrostomy performed in order to decompress the kidneys. In this group of patients during the timely diagnosis and surgical treatment reduced death by 10.3% (from 29 patients died 3).

Frequently encountered cause of prerenal acute renal failure in 55% of cases was a violation of systemic microcirculation of vital organs.

Renal (parenchymal), acute renal failure was observed in 23% of patients.

Postrenal acute renal failure was observed in 20% of patients, the cause of which was the bilateral obstruction concretions, ureteral compression of patients from outside, carried retroperitoneal tumor tissue (fibroma).

OUTPUT

Thus, the timely implementation of comprehensive clinical, laboratory and imaging studies using modern technology are informative for the early diagnosis of acute renal failure. This increases the effectiveness of the therapy, survival, reduced mortality in the pre-renal acute renal failure to 19 with renal, postrenal to 6 and to 3 respectively.

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EINSATZ DER INVAGINIERENDEN CHOLEDOCHO-JEJUNO-ANASTOMOSE BEI ZYSTISCHER ERWEITERUNG DES DUCTUS CHOLEDOCHUS

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Bis vor kurzem galt es als allgemein bekannt, dass die zystische Erweiterung des Ductus choledochus in der Regel bei Kinder und Jugendlichen auftreten. Die letzten statistischen Studien ergeben allerdings, dass Gallengangszysten bei Patienten jedes Alters vorkommen können (3). Bei verspäteter Diagnosestellung und Behandlungsbeginn können bei dieser Erkrankung ernstzunehmende postoperative Komplikationen auftreten (5).

Es gibt verschiedene Möglichkeiten der operativen Behandlung von Gallengangszysten. Bei den Kindern ist es nachgewiesen, dass eine oft vorliegende hohe Einmündung von Ductus pancreaticus in den Ductus choledochus bei gleichzeitig vorliegender Sphinkterinsuffizienz mit Einstrom des Pankreassekret in den Gallengang einhergeht (1, 2, 3).

Der Reflux ist ein wichtiger Einflussfaktor der Strukturveränderungen im Gallengang, die sich malignitätsfördernd auswirken. Allerdings schließt keine der etablierten operativen Therapien die Möglichkeit der Entwicklung von Reflux-Cholangitis, Anastomosenentzündung sowie maligner Transformation der Zyste aus. Deswegen ist die Suche nach neuen operativen Therapien sehr wichtig.

FRAGESTELLUNG DER ARBEIT

Entwicklung der optimalen operativen Therapie von Gallengangszysten

METHODEN

Im Zeitraum zwischen 1996 und 2010 waren 13 Kinder im Alter von 2 bis 12 Jahren in der kinderchirurgischen Abteilung von TIPPMK in Behandlung. Das typische klinische Bild der zystischen Gallengangerweiterung bestand aus Bauchschmerzen, Ikterus, palpablen tumorartigen Resistenz im Bauch, selten mit Fieber und Schüttelfrost. Alle Kinder wurden orientierend klinisch untersucht, Routine-Laboruntersuchung von Blut

und Urin sowie Sonographie und CT-Abdomen wurden durchgeführt.

Bei 6 von 13 Kinder wurde die Diagnose der Gallengangszysten durch Ultraschall gestellt. Bei 7 Kinder gelang die Diagnosestellung erst durch das CT. Eine Zysto-Choledocho-Jejuno-Anastomose wurde bei 4 Patienten durchgeführt, bei 7 Patienten entschied man sich für eine biliodigestive Anastomose mit ausgeschalteter Dünndarmschlinge nach Roux mit der Invagination.

Ergebnisse und Diskussion: 95% der Patienten klagten über Schmerzen im rechten Rippenbogen, 55% über Schmerzen im Oberbauch, 25% über periumbilikale Schmerzen, die durch Stauung von Galle und Pankreassekret im zystisch erweiterten Gallengang bedingt sind. Die akute Schmerzen waren den Gallenkoliken ähnlich. Die tumorähnliche Resistenz war bei 56% der Kinder tastbar, Fieber trat bei 29% der Patienten auf. 18% der Kinder, die lange an eine Gallengangszyste litten, wiesen ein Untergewicht von bis zu 80% des Normgewichtes auf. 82% der Patienten hatten erhöhte Bilirubinwerte, 3 von 13 Kinder zeigten klinisch einen akuten Beginn der Erkrankung, 10 zeigten einen chronischen Verlauf mit Schüben und Remission.

Wir stellten verschiedene Formen der zystischen Aufweitung fest, bei 3 Kinder war eine sackartige Zyste vorhanden, bei 9 Kindern eine spindelförmige Erweiterung, bei einem Kind zystische Erweiterung des Choledochus.

Präoperativ wurde in zwei Fällen eine Echinococcus-Zyste festgestellt, in 11 Fällen eine Gallengangszyste. Bei 3 Patienten mit einer sackartigen Erweiterung des Gallenganges und einem Patient mit zystischer

Erweiterung führten wir eine Zysto-Choledocho-Jejuno-Anastomose durch. Bei 7 Patienten mit spindelförmiger Erweiterung wurde der proximale Anteil des Ductus Choledochus reseziert und eine Anastomose mit ausgeschalteter Dünndarmschlinge nach Roux angelegt. Die Zystenresektion mit der Anlage der biliodigestiven Anastomose nach Roux mit Antireflux-Naht mit Invagination wurde bei 7 von 9 Patienten gemacht. Die modifizierte OP nach Roux mit zusätzlicher Invagination, die wir in unserem Hause entwickelt haben, wird folgendermaßen durchgeführt: die zystische Aufweitung wird von allen Seiten komplett freipräpariert und zur Vorbereitung auf die Resektion dargestellt. (Bild 1)

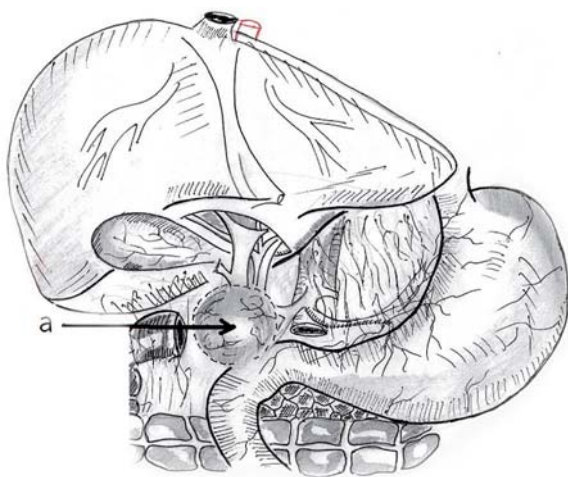


Bild 1. Zystische Erweiterung des Gallengangs (a)

Das wichtigste bei der Präparation der Zyste ist die Ablösung von der rechten Leberarterie, denn das Gefäß verläuft hinter der Zyste und ist meistens stark mit dem Gallengang verklebt. Nach der Darstellung der Zyste reseziert man den Abschnitt, der der Leber am nächsten liegt. (Bild 2)

Der distale Teil des Choledochus wird nach Möglichkeit maximal dargestellt, abgetrennt und provisorisch verschlossen. Es ist wichtig daran zu denken, dass der Pankreasgang bei den meisten Kinder separat in der Wand des Gallengangs mündet. Deswegen soll man sehr behutsam während der Darstellung und des Verschlusses des distalen Anteils der Zyste, der meist weit lateral liegt, vorgehen. Der Verschluss des unteren Anteils der Zyste wird mit einer fortlaufenden Naht in der ersten Reihe durchgeführt, der Verschluss der zweiten Reihe wird mit Einzelknopfnähten gemacht. Hierbei wird Prolene (5/0) empfohlen.

Vor der Resektion der Zyste und Anlage der Anastomose muss man eine Dünndarmschlinge darstellen und zuerst eine Anastomose zwischen dem

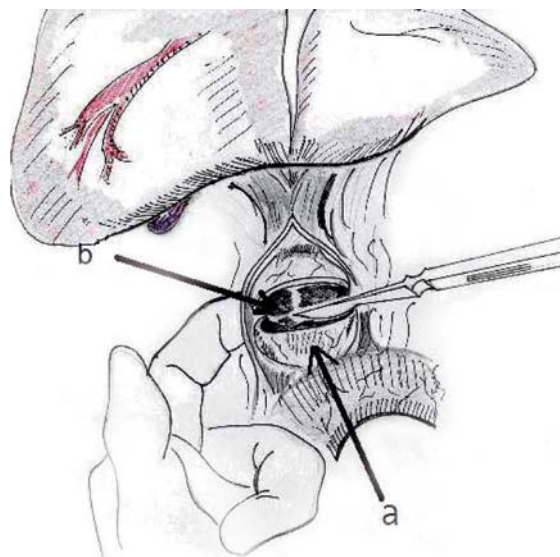


Bild 2. Resektion der Gallengangszyste (a), Darstellung des proximalen Teiles (b)

unteren Teil der Schlinge und dem Ende der anderen Darmschlinge anlegen. Danach wird der obere Teil der Dünndarmschlinge hinter dem Colon gelegt und mit Prolene (5/0) eine Anastomose zwischen Dünndarm und dem mittleren Choledochusteil gemacht (Bild 3).

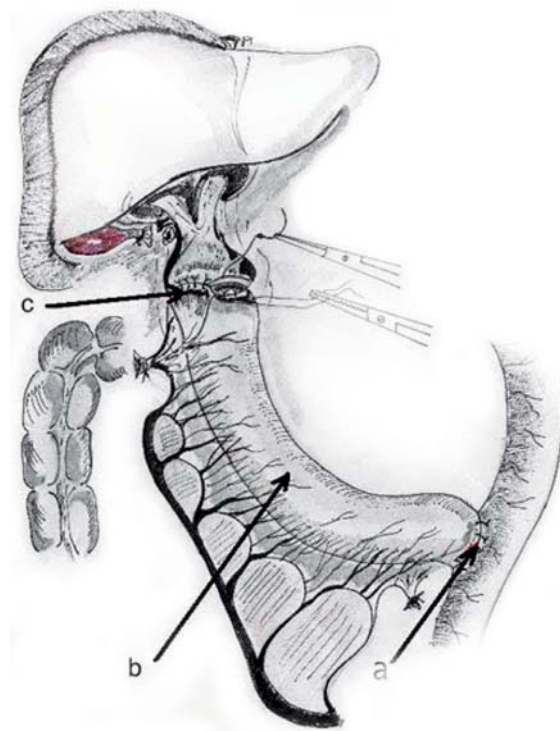


Bild 3. Anastomose zwischen der dargestellten Dünndarmschlinge und Dünndarm (a), Dünndarmschlinge (b), Anastomose zwischen Dünndarm und dem mittleren Choledochusteil (c).

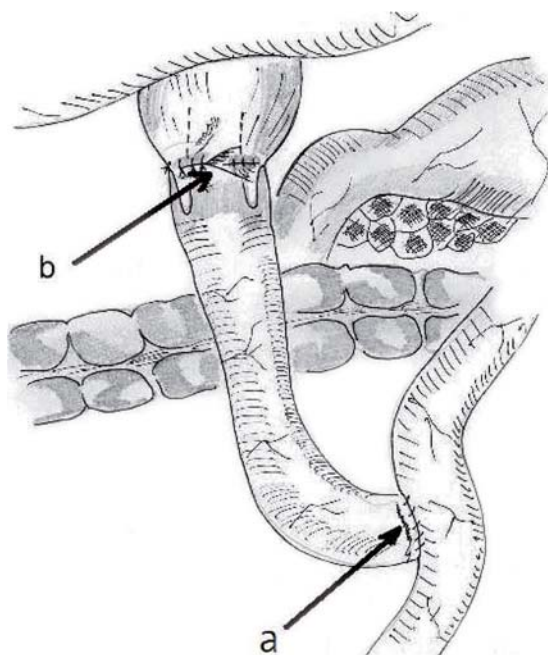


Bild 4. Anastomose zwischen der ausgeschalteten Dünndarmschlinge und dem oberen Anteil des Dünndarms (a), Anastomose zwischen der Darmschlinge und Glisson-Kapsel (b)

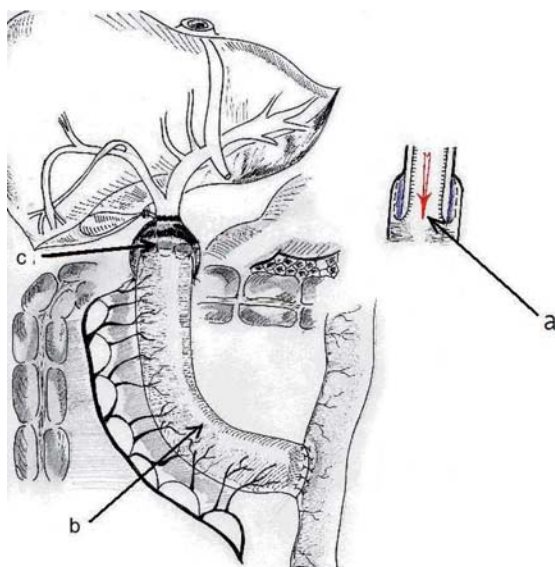


Bild 5. Invagination des proximalen Choledochus-Anteil in das Lumen der spannungsfrei angelegten Darmschlinge (a), Dünndarmschlinge (b), Linie der Choledochus-Anastomose (c).

Die Anastomose wird in der Regel mit zwei Nahtreihen angelegt, eine dritte Nahtreihe wird mit 4-5 Nähten 1 cm von der Anastomoselinie entfernt zwischen der Darmwand und der Glisson-Kapsel durchgeführt (Bild 4).

Nach der Vervollständigung der Naht wird der proximale Anteil des Choledochus in das Lumen der spannungsfrei anliegenden Dünndarmschlinge invaginiert und somit ein Reflux-Hindernis geschaffen (Bild 5).

Bei der Choledochus-Jejuno-Anastomose nach Roux modifiziert mit Invagination sind keine akuten postoperativen Komplikationen aufgetreten. Bei der langfristigen Beobachtung klagten 3 Patienten bei Zustand nach Zysto-Choledochus-Jejuno-Anastomose über zeitweise auftretenden Meteorismus und epigastrische Schmerzen. Alle Patienten, bei denen die modifizierte Antireflux-Invagination nach Roux durchgeführt wurde, waren klinisch 3 bis 5 Jahre postoperativ beschwerdefrei, sonographisch sind keine zystische Erweiterung der Gallengänge nachgewiesen.

ZUSAMMENFASSUNG

Moderne nicht-invasive diagnostische Methoden wie z.B. Sonographie und CT sind für eine Frühdiagnostik der Gallengangszysten am besten geeignet. Die biliodigestive Anastomose mit ausgeschalteter Dünndarmschlinge nach Roux und unsere modifizierte Methode mit Anti-Reflux-Invagination ist eine radikale Therapieoption.

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CONDITION OF ABNORMAL DEVELOPMENT OF CONNECTIVE TISSUE IN CHILDREN WITH GIARDIASIS

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It is well known that the connective tissue is the basic tissue (90%) in the human body [1]. Minor abnormalities are indirect criteria of the degree of formation of connective tissue. It can testify about the adequacy of the formation of connective tissue in the fetal stage of maturation [2,3]. However, the small anomalies of connective tissue in children can affect the course of intercurrent diseases. It can be cause of more rapid or gradual development, and, most importantly, it can to influence the effectiveness of therapy [4]. Obviously, dysplasia is marker of condition of connective tissue and may predispose in the formation of various diseases at different postnatal stages. Until now, many aspects of the problem are still poorly understood, including the prevalence, which depends on the classification criteria of minor abnormalities.

We studied the prevalence of small features of connective tissue abnormalities in children with giardiasis.

We examined 29 children with giardiasis, treated at the infectious diseases hospital in Karaganda. The diagnosis of giardiasis was verified by clinical and laboratory-instrumental methods. Patients' ages ranged from 5 to 16 years. The boys were — 62.1%, girls — 37.9%. Symptoms of giardiasis characterized by pain (82.6%), diarrhea (76%) and intoxication (70%) syndromes. The control group consisted of 15 healthy children of similar age. The data obtained were subjected to statistical analysis using the *t*-test.

In the study, we found that among children with giardiasis were significantly more met the following minor anomalies of the connective tissue compared with the control group ($p < 0.05$). The most frequently

(41.3%) among children was revealed pathology of bones and joints, often in the form of joint hypermobility (34.3%), kyphoscoliosis (31%), flat feet (27.5%), dysfunction of the temporomandibular joint (24.1%), the hollow feet (17.2%), hyperlordosis (13.7%) "sandal gap" (13.7%). Pathology of the skin was 27.5%, mainly due to the hyperelasticity of skin (17.2%), hyperpigmentation, hypopigmentation (13.7%), transverse crease on the stomach (10.3%). Pathology of the muscular system was revealed in the form of muscle hypotonia (48.2%), diastasis of rectus abdominis muscles (13.7%).

Mitral valve prolapse (31%) and false chord of the left ventricle (24.1%) were more common in girls ($p < 0.05$), and pathology of the organs of vision in the form of myopia (51.7%), astigmatism (27.5%). The pathology of the gastrointestinal tract ($p < 0.05$) was represented among children, anomalies of the gallbladder — 37.9%, dyskinesia of the gallbladder — 31%, gastropnoxis — 10.3%. Minor abnormalities of connective tissue of the urinary system ($p < 0.05$) more often shown nephroptosis — in 13.7% of cases, the structure of renal anomalies detected in 13.3%. Dysplasia of the connective tissue of the nervous system manifested dystonia syndrome (65.5%), headache (13.7%). Recurrent nosebleeds, heavy menstrual bleeding, easy bruising, increased bleeding gums, prolonged bleeding after cuts the skin and tooth extraction was observed in 68.9% cases. Analysis showed that small abnormalities were frequently in boys, compared with girls.

Proceeding from the above, it is possible to assume that at the children with giardiasis the qualitative and quantitative structure of minor abnormalities

of development of connecting tissue has the features demanding careful studying.

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TRAUMA UND PSYCHISCHE KRANKHEIT. TRAUMAKONZEPTE IM HISTORISCHEN WANDEL: EIN BEITRAG ZUR MEDIZIN- UND WISSENSCHAFTSGESCHICHTE

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Die Geschichte der wissenschaftlichen Diskussion um Trauma und psychische Krankheit nimmt etwa Mitte des 19. Jahrhunderts ihren Ursprung. In dieser Zeit wurde dem Begriff Trauma, der aus dem Griechischen kommt und „Wunde“ bedeutet, zunächst nur zur Beschreibung von körperlichen Verletzungen diente, eine weitere Bedeutung beigemessen — er wurde erstmals auch im Sinne einer seelischen Verletzung verwendet. Im Laufe der Geschichte wurde immer wieder kontrovers über psychische Traumatisierung diskutiert, wobei es im Wesentlichen um zwei Kernfragen ging: Gibt es einen ursächlichen Zusammenhang zwischen einem Trauma und etwaigen Symptomen? Wenn ja, wie lässt sich dieser erklären? Liegt eine organische Erkrankung oder eine psychische Störung vor? Die Position, die zu diesen Fragen bezogen wurde, hatte weit reichende Konsequenzen für Rechtsprechung, Gesundheits-, Finanz-, Innen- und Außenpolitik und sorgte somit für eine außerordentliche Brisanz der Kontroversen. Entsprechend dem historischen Kontext und sozialpolitischer Gegebenheiten wurden diese Fragen in der Vergangenheit unterschiedlich bewertet. Wurde das Konzept einer durch Traumata verursachten psychischen Krankheit bejaht, waren die Vorteile, die sich hieraus für Patienten ergaben evident. Sie hatten nunmehr ein Anrecht auf medizinische Versorgung, Krankenversicherung, gegebenenfalls Entschädigung oder die Gewährung einer Rente. Doch physische Korrelate der Störung ließen sich

nicht nachweisen. Auch die Traumata ließen sich nicht objektivieren. Wie war sicher zu stellen, dass die Symptome der Patienten nicht bloß simuliert waren?

Trotz der fast 150 jährigen Begriffsgeschichte des psychischen Traumas und den in Deutschland zum Teil heftig geführten Diskussionen hatte sich das Konzept einer durch Traumata verursachten psychischen Erkrankung lange nicht durchsetzen können. Im Gegensatz hierzu wurde in den 1970er Jahren in den USA durch den Vietnamkrieg und die hierauf folgende Antikriegsbewegung der Weg geebnet, Platz für die diagnostische Kategorie Post-Traumatic Stress Disorder (kurz PTSD) zu schaffen. Hiermit kam die amerikanische Regierung vor dem Hintergrund der innenpolitisch angespannten Situation ihrer Verpflichtung nach, Verantwortung für die amerikanischen Kriegsveteranen zu übernehmen. Durch Aufnahme der PTSD als diagnostische Kategorie wurde den Kriegsveteranen Zugang zu medizinischer Versorgung, Renten und Entschädigung gewährt, worauf sie andernfalls keinen Anspruch gehabt hätten.

Mittlerweile ist das Konzept längst in der gesamten westlichen Welt, so auch in Deutschland, angekommen. 1991 wurde eine entsprechende Diagnose, die Posttraumatische Belastungsstörung (kurz PTBS), in das internationale Diagnosenhandbuch, das ICD, aufgenommen.

Dieser medizinhistorische Beitrag verfolgt das Anliegen die kontextabhängige dynamische Wandelbarkeit des Traumbegriffes und zugehöriger Konzepte aufzuzeigen und deren enge Verwobenheit von politischen, sozialen und kulturellen Gegebenheiten mit den sich verändernden Denkweisen über Trauma und psychische Krankheit darzustellen.

DIE ROLLE DER ERNÄHRUNGSMEDIZIN UND DIÄTTHERAPIE IN DER KLINISCHEN MEDIZIN UND PRAXIS

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In den letzten Jahren und auch aktuell sind Statistiken zur Prävalenz und Inzidenz von sogenannten Volkskrankheiten wie beispielsweise die Adipositas, art. Hypertonie und der Diabetes sowie deren Folgeerkrankungen, aber auch klinisch relevanten Komplikationen wie die Mangelernährung mehr als Besorgnis erregend. Die weltgrößte Gesundheitsstudie „Global Burden of Diseases Study“ 2010 gibt einen Eindruck über die wachsenden Herausforderungen, denen sich das Gesundheitssystem und die Volkswirtschaft weltweit stellen müssen. Die drei häufigsten Risikofaktoren für die weltweit vorkommenden Krankheitsfälle sind die Hypertonie, Rauchen und chron. Alkoholkonsum. 2010 starben weltweit 9,4 Mio. Menschen an den Folgen von Bluthochdruck, 12,9 Mio. Menschen an den Folgen ischämischer Herzerkrankungen und Schlaganfälle, 6,3 Mio. Menschen an den Folgen der Nicotinsucht, 1,3 Mio. Menschen an den Folgen des Diabetes mellitus und mehr als 3 Mio. Todesfälle waren auf einen zu hohen BMI zurückzuführen (1). Bis zum Tod gibt es aber Jahre bis Jahrzehnte lange Krankheits- und Behandlungszeiten, Klinikaufenthalte, Kosten und menschliches Leid. Laut Schätzungen der GBDS 2010 werden kurz nach dem Jahr 2015 mehr über 65-jährige als Kinder unter 5 Jahren auf der Welt leben. Paradox erscheinen dazu die steigende Lebenserwartung im Kontext zur steigenden Erkrankungsrate, längeren Behandlungsdauer und zunehmenden Behandlungsinintensität incl. Komplikationszuwachs. Das Krankheits-Eintrittsalter sinkt und die finanziellen Ressourcen sind weitestgehend erschöpft. Allseits steigt das Bemühen, kosteneffizient den zunehmenden medizinischen Herausforderungen zu begegnen. Bisherige Maßnahmen präventiv und therapeutisch scheinen nicht ausreichend und nachhaltig genug, was allein im Bemühen die Adipositas zu stoppen mehrfach belegt werden musste. Zahlen aus Deutschland lassen leider auch keinen Optimismus zu.

6 Mio. der erwachsenen Menschen haben einen bekannten Diabetes mellitus, davon haben 90% einen DT2. Schätzungen nach liegt die Dunkelziffer (unerkannte Diabetes-Fälle) bei 7–8 Mio. Betroffenen (2). Kosten von 18 Mrd. € pro Jahr bzw.



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2600€/Person/Jahr belasten das deutsche Gesundheitssystem, somit ist der Diabetes die teuerste chron. Erkrankung (3). Das Deutsche Diabeteszentrum Düsseldorf prognostiziert bis zum Jahr 2030 einen Diabetes T2 Zuwachs, nur in der Altersgruppe 55–74 Jahre, von 1,5 Mio. Neuerkrankungen (4). Die Daten der NVS II (Max Rubner Institut 2008) zeigen, dass 58,2% der Gesamtbevölkerung übergewichtig sind, davon 20,8% adipös. 2011 starben in Deutschland 40,2% der Todesfälle an Herz-Kreislauferkrankungen. In Deutschland findet sich die höchste Hypertonie-Prävalenz in Europa und bei der Schlaganfall-Mortalität steht Deutschland mit an Europas Spitze. 2008 verursachte die Behandlung der Hypertonie in Deutschland Kosten von 9 Milliarden Euro (StBa 2010). 43,9% der Frauen und 51,4% der Männer haben eine bekannte und behandelte Hypertonie (RKI 2008). Im Gegensatz dazu ist in deutschen Kliniken jeder 4. Patient mangelernährt (5). Vor diesem Hintergrund muss sich jeder Leistungserbringer auf diesem Sektor fragen, ob dem noch beizukommen ist und wenn ja, wer hat noch Ressourcen, und sind diese bislang ausreichend erkannt und genutzt. Alle aufgeführten Erkrankungen, und die Liste lässt sich deutlich erweitern, sind ernährungsmedizinisch sowohl präventiv vor allem auch diättherapeutisch maßgeblich und positiv zu beeinflussen. Diätassistenten aber auch Ökotrophologen und Ernährungswissenschaftler mit anerkannten Weiterbildungen sind prädestinierte, anerkannte und qualifizierte Leistungserbringer. Wer sonst ist in der Lage und hat das nötige Fachwissen, eine komplexe Diättherapie von der Aufnahme bis zu Entlassung eines Patienten durchzuführen? Der Umfang erstreckt sich vom Screening, Ernährungs-Assessment, Ernährungs-

diagnose über die Intervention, Evaluation, Überwachung, Codierung, Dokumentation und Beratung (6). Die Implementierung anerkannter und qualifizierter Leistungserbringer auf diesem Sektor sichert und verbessert nicht nur das Patientenwohl und reduziert das Risikoprofil und Komplikationsraten, sondern erwirtschaftet darüber hinaus Gewinn und Kostenersparnis. Der totale Netto-Nutzen der Diättherapie durch Diätassistenten beläuft sich auf 0,4–1,9 Milliarden Euro (7). Bei rechtzeitiger Intervention krankheitsbedingter Mangelernährung bereits bei Patienten mit hohem Risikoprofil können bis zu 2,5 Krankenhaustage (8) bzw. zwischen 200–1500€ pro Patient eingespart werden (9, 10, 11). Die Leitlinien der American Dietetic Association, noch sehr fragmentarisch in Deutschen Leitlinien, der Algorithmus von Weimann et al., „Supportiver Einsatz von Trinknahrung von erwachsenen Patienten“ sind richtungsweisend, die konsequente Nutzung der Ernährungsmedizin und Diättherapie ist dringend, flächendeckend und nachhaltig notwendig.

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MODERNE ASPEKTE DER DEMENZERKRANKUNG

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Weltweit nimmt die Anzahl von Demenzerkrankungen zu. Dabei beträgt der Anteil der degenerativen Formen (Morbus Alzheimer) bis zu 60 %. Gegenwärtig nimmt man an, dass in Deutschland 1,3 Millionen an Demenz erkrankt sind. Viel versprechende Untersuchungen über die Entstehung von neurodegenerativen Veränderungen haben noch nicht den therapeutischen Durchbruch ergeben. Während moderne bildgebende Verfahren eine Früherkennung zulassen (PET, MRT), sind Forschungen nach speziellen Indikatorproteinen, d.h. Biomarker, noch im vollen Gange.

Gegenwärtig werden in der klinischen Praxis die nichtmedikamentösen und medikamentösen Verfahren angewandt, wobei für die Behandlung der Alzheimer- Demenz zwei Medikamentengruppen zur Verfügung stehen. Das sind Memantine und Acetylcholinesterasehemmer. Die klinischen Studien zeigten auch Verbesserungstendenzen in der kognitiven Leistungsfähigkeit. Für die vaskuläre Demenz gibt es gegenwärtig kein zugelassenes Medikament.

Möglicherweise kann ein Krebsmittel – Bexaroten- typische Alzheimersymptome rückgängig machen. Diese Aussage kommt von US – Forschern, die im Tierversuch ein Rückgang der charakteristischen Eiweißablagerungen im Gehirn feststellen konnten. Inwieweit eine hoffnungsvolle Behandlung bei Menschen möglich ist, bleibt jedoch abzuwarten.

METABOLISCHES SYNDROM

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Es wird der Begriff des metabolischen Syndroms definiert. Die Frage nach dem Sinn einer solchen Definition wird diskutiert.

Die historische Entwicklung der Auseinandersetzung mit dem Krankheitsbild wird hierbei dargestellt und dabei auf die gesellschaftlichen und geografischen Einflüsse eingegangen.

Die wesentlichen Komponenten des metabolischen Syndroms, wie Adipositas, Diabetes mellitus, Fettstoffwechselstörung und Hypertonie werden mit dem Schwerpunkt der Adipositas und des Diabetes mellitus erörtert. Hierbei werden die Pathophysiologie, die Klinik und die Therapie dieser Erkrankung dargestellt und die wechselseitigen Zusammenhänge aufgezeigt. Als bedeutender Risikofaktor



für das Herz- und Gefäßsystem werden die Folgen des metabolischen Syndroms anhand bedeutender arteriosklerotischer Folgeerkrankungen, wie koronare Herzerkrankung, Apoplex und periphere arterielle Durchblutungsstörung dargestellt.

Zusammenfassend wird auf die Möglichkeiten der Senkung des Auftretens an Patienten mit metabolischen Syndromen eingegangen und es werden die individuellen und gesellschaftlich-systemischen Einflüsse zur Erreichung dieses Ziels diskutiert.

GIANT PEPTIC ULCER HAEMORRHAGE: EPIDEMIOLOGY, TREATMENT AND OUTCOME IN TARTU UNIVERSITY HOSPITAL, ESTONIA

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BACKGROUND

It is generally known that patients with giant peptic ulcer haemorrhage (GPUH) are at high risk for poor treatment outcome. The aim of the present study was to analyse epidemiology, treatment and outcome in GPUH during a longer period.

PATIENTS AND METHODS

We analysed the data of 953 patients with 1053 cases (haemorrhage episodes) treated for peptic ulcer haemorrhage during 2003–2012. As a rule, the source and intensity of haemorrhage was assessed endoscopi-

cally according to the Forrest scale I–III (high risk stigmata Forrest Ia–IIb). Ulcer haemorrhage was classified as gastric ulcer haemorrhage (GUH) and duodenal ulcer haemorrhage (DUH): prepyloric, pyloric and duodenal bulb ulcers.

Of the 1053 cases 247 (23%) were GPUH (diameter ≥ 2 cm) group I, and the remaining 806 cases were peptic ulcer haemorrhages with standard size (SPUH) (diameter < 2 cm) which formed the control group (group II).

To stop the haemorrhage injection methods of endoscopic treatment were commonly used: a combined method of adrenalin with ethanol, adrenalin alone or ethanol alone. Information about the drug use potentially associated with poor outcome of haemorrhage was obtained from medical records.

RESULTS

In group I, GUH cases occurred significantly more frequently compared to group II, 50% (124/247) vs 32% (262/806), respectively, as did high risk stigmata, 78% (193/247) vs 52% (421/806), and the drug use potentially promoting haemorrhage, 65% (161/247) vs 58% (467/806). Endoscopic haemostasis was used significantly more frequently in group I than in group II, 68% vs 51%, as were used repeated haemostasis procedures, 17% vs 7%, and blood transfusions, 88% vs 75% of the cases.

In group I, 57 (24.6%) of the 232 patients were operated: 14 (12%) of the 115 GUH patients and 43 (36.7%) of the 117 DUH patients, with 1 and 3 death cases, respectively. In group II, 10 patients (1.4%) were operated: 4 (1.7%) of the 238 GUH patients and 6 (1.2%) of the 483 DUH patients. Altogether 14 patients (1.5%) of the 953 died: in group I, 9 (3.9%) of the 232 and in group II, 5 (0.7%) of the 721 patients.

CONCLUSION

Giant ulcer haemorrhages, compared to standard size ulcer haemorrhages, occur more frequently in the stomach than in the duodenum; the haemorrhage is more intensive and requires more often endoscopic haemostasis, including repeated procedures, as well as blood transfusions and operative treatment. In duodenal giant ulcer haemorrhage operative treatment is required three times as frequently as in gastric giant ulcer haemorrhage. Endoscopic haemostasis and operative treatment allow to reduce lethality from giant ulcer haemorrhages up to 3.9%.



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