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CONTENT

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PARAMETERS OF THE PLOIDY OF NUCLEI OF LIVER HEPATOCYTES IN WHITE RATS UNDER THE INFLUENCE OF HYPOTHERMIA DEPENDING ON THE COOLING ENVIRONMENT

Altai State Medical University, Barnaul

E.E. Alymova

The article describes the cooling effect on the ploidometric profile of hepatocytes in experimental animals. Changes in the ploidy of hepatocytes of white rats depending on the cooling environment were determined.
Key words: *hypothermia, liver, ploidy.*

Ambient temperature is one of the main abiotic factors providing homeostasis of humans and animals. Change in the thermal condition towards lowering the temperature leads to violations of all systems of the body. It is shown that the severity of the response reaction of the body depends on the level of body temperature reached during hypothermia, as well as on the physical and chemical characteristics of the environment.

The objective was to study the ploidy of nuclei of hepatocytes of white rats under the influence of the cold factor depending on the cooling environment.

Materials and methods

The study was conducted on 50 white Wistar rats. Animals were divided into three groups: group 1 – the control group (n=10); group 2 – animals who were subjected to deep water hypothermia (n=20); group 3 – animals who were subjected to moderate air hypothermia (n=20). Single deep water hypothermia was modeled through placing animals in water of 5°C. Exposure time amounted to 40±5 min. Single air hypothermia was modeled through placing animals in a cooling chamber at an air temperature of –25ºC. Exposure time amounted to 6±3 hours. Animals were taken out of the experiment in 1, 2, 7, and 14 days from the beginning. The materials were colored according to the Feulgen stain. Measurements were carried out using the morphometric program VideoTest-Morphology 5.2. Statistical processing of the material was carried out with the use of the Statistica 10.0 statistical package.

Results

The results of the study showed that in the nuclei of hepatocytes of rats of group 1 the DNA uptake ratio was 3.5c±0.1. Diploid (2c) nuclei made 20%, triploid (3c) – 30%, tetraploid (4c) – 46% and octoploid (8c) – 4%.

For day 1 in group 2, the DNA uptake ratio in the nuclei was equal to 3.2c±0.2. Hepatocytes with 1c nucleus ploidy made 3.4%, 2c – 43.8%, 3c – 16.85%, 4c – 21.35%, 5c – 4.5%, 6c – 2.25%, 7c – 6.7%, and 8c – 1.15%.

In group 3 for day 1 right away, the DNA uptake ratio increased by 2.5 times (8.05c±0.2). The number of clones with the DNA uptake ratio from 6c to 8c increased and clones with the DNA uptake ratio from 9c to 13c appeared.

In 2 days after hypothermia, the DNA uptake ratio in nuclei averaged 5.7c±0.2 in group 2. Hepatocytes with 1c nucleus ploidy made 0%, 2c – 5%, 3c – 12.5%, 4c – 11.25%, 5c – 23.75%, 6c – 15%, 7c – 13.75%, 8c – 7.5%, 9c – 6.25%, 10c – 1.5%, 11c – 1.25%, 12c – 0%, and 13c – 1.25%.

In group 3 after 2 days, the DNA uptake ratio did not differ from group 2 (5.5c±0.1). Hepatocytes with 3c nucleus ploidy made 4.1%, 4c – 24.5%, 5c – 24.5%, 6c – 22.4%, 7c – 15.3%, 8c – 6.1%, 9c – 3.1%. Hepatocytes with the DNA uptake ratio from 10c to 13c disappeared.

In 7 days in group 2, the DNA uptake ratio was 9.3c±0.2. Hepatocytes with 1c ploidy made 0%, 2c – 0%, 3c – 0%, 4c – 0%, 5c – 1.4%, 6c – 1.4%, 7c – 6.8%, 8c – 16.4%, 9c – 32.9%, 10c – 27.4%, 11c – 5.5%, 12c – 2.7%, and 13c – 5.5%.

In group 3 after 7 days compared to group 2, the DNA uptake ratio was 2.1 times less (4.4c±0.1). Hepatocytes with 3c ploidy made 16.25%, 4c – 52.5%, 5c – 13.75%, 6c – 10%, 7c – 6.25%, 8c – 0%, and 9c – 1.25%.

In 14 days in group 2, the DNA uptake ratio was 5.0c±0.2. Hepatocytes with 1c ploidy made 0%, 2c – 6.7%, 3c – 8.3%, 4c – 26.7%, 5c – 23.3%, 6c – 18.3%, 7c – 16.7%, 8c – 0%, 9c – 0%, 10c – 0%, 11c – 0%, 12c – 0%, and 13c – 0%.

In group 3, the DNA uptake ratio was 1.5 times lower (3.4c±0.1). Hepatocytes with the 2c DNA uptake ratio made 17.5%, 3c – 30%, 4c – 51.25%, and 7c – 1.25%. Hepatocytes with the DNA uptake ratio of 5c and 6c were absent.

Conclusion

Thus, the results of the study showed that the cooling environment had a significant impact on

the ploidometric profile of hepatocytes of experimental animals, and the strength of this effect was primarily interconnected with different cooling rates.

Conflict of interest. The authors declare no conflict of interest.

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UDC 796.06

DETERMINATION OF PHYSICAL ACTIVITY IN STUDENTS OF ASMU

Altai State Medical University, Barnaul

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The article presents a description of the results of physical activity assessment among students of the medical university. At the assessment, the physical activity level of students of the 3–5 year in ASMU was studied.
Key words: *physical activity of students, physical activity level, healthy lifestyle.*

An integral part of a healthy lifestyle is the optimum level of physical activity. Physical activity is any activity aimed at maintaining or improving physical fitness and health in general. In the modern world, every person tries to pay attention to their physical form and health, but taking into account the high study load at a medical university, one can find a decrease in physical activity, represented by hypodynamia associated with a permanent sedentary lifestyle and learning material. In turn, hypodynamia is a risk factor for the development of a number of diseases, as well as the decrease in physical and mental performance.

The work objective: to assess the physical activity among students of ASMU.

Tasks:

1. Determine the physical activity level in students.
2. Determine the hygienic norm of physical activity for students.
3. Develop recommendations for increasing the physical activity level for groups of people with a low level of it on the basis of the results of the study.

Materials and methods

The object of the study was the 3-, 4-, 5-year students of ASMU totaling 309 people.

In order to identify the physical activity level in students, we used the physical activity assessment test developed by J. Ricci and L. Gagnon, University of Montreal.

Methods of mathematical statistics were also used to identify the average values of the physical activity level among 3-, 4-, 5-year students.

Results and discussion

The method of testing revealed that on average among students from 3 to 5 years there was moderate physical activity, but if we consider each year separately, the indicators vary. For example, 3rd year students had a lower physical activity level compared to 4th and 5th year students with moderate and high physical activity levels (in equal measure among 4th and 5th year students).

This allows us to conclude that today the 3rd year students suffer from hypodynamia, which is more related to the fact that the students of this year have much greater mental workload and volume of the studied material and disciplines than the 4-, 5-year students. These results are an indicator for developing recommendations for improving physical activity.

Conclusion

Determining the physical activity level is of great importance in the health of the nation. With moderate and high physical activity levels, a person can prevent the development of various diseases, as well as maintain their body in excellent physical shape. People with a reduced physical activity level should adjust their lifestyle with increased motor activity in order to avoid the development of various diseases, as well as the decrease in mental and physical performance.

Conflict of interest. The authors declare no conflict of interest.

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REVISITING THE ENDOMETRIUM PATHOLOGY IN POSTMENOPAUSE

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The paper presents an analysis of the archive histories of diseases of postmenopausal patients who were examined and treated in the period from 2012 to 2017. Predominantly asymptomatic course of endometrium pathological processes in elderly and senile patients was revealed. Polyps prevail in the structure of endometrium pathology, the frequency of endometrial carcinomas is higher than the population ones.
Key words: *endometrium, postmenopause.*

In recent years, there has been considerable interest in the problems of the postmenopausal period in connection with the tendency to population aging, unfavorable ecological situation, increasing frequency of chronic somatic diseases and decreasing immunity, which leads to an increase in the number of women with endometrial hyperplastic processes EHP (5–25% of gynecological patients) [1, 3, 6, 7].

The topicality of studying the features of pathological processes of the postmenopausal period of a woman's life is obvious. In the structure of gynecological morbidity of postmenopausal women, the endometrium pathology is most common [2, 4, 5].

The aim of the work was to optimize diagnostics and improve tactics of management of postmenopausal women with the endometrium pathology on the basis of the study of archival histories of diseases.

Research tasks:

1. Study anamnestic characteristics, results of ultrasound and endoscopic examinations of the uterus, data of endometrium pathomorphological studies.
2. Assess somatic and anatomical difficulties in hysteroscopy in elderly patients.
3. Determine the features of endometrium pathological processes in postmenopause.

Materials and methods

In order to achieve this aim, the data of archival histories of diseases of 152 patients aged from 50 to 85 years (average – 60.2±8.1 years), examined and treated for the period of 2012–2017 in the gynecology department of the Divisional Clinical Hospital at Barnaul station were analyzed.

Anamnestic data, risk factors for the development of genital disease, results of ultrasound, endoscopic and pathomorphological research methods, as well as technical features of hysteroscopy in postmenopausal age, risk of complications after manipulation were evaluated.

Results and discussion

The age of menopause varied from 29 to 57 years (an average of 49.8±4.3 years). When studying the social status, it was found that about a third of the surveyed population of postmenopausal patients were employees (62 patients, 41%), the rest (90 patients, 59%) were unemployed pensioners. Thus, the importance of examination and treatment of patients with the intrauterine pathology in the postmenopausal period is obvious from both medical and socio-economic perspectives.

For the first time for examination of uterine cavity pathology in postmenopause, 134 patients (88.2%) were admitted, 18 patients (11.8%) were re-admitted.

The analysis of anamnestic data showed that the age of menarche was 13.5 years. Primary infertility was observed in 2.6% of sexually active patients, the rest had pregnancy and childbirth. In the analysis of gynecological pathology, it was found that most often in patients there were uterine myoma (44.4%), inflammatory diseases of the genitals (32.2%), cervical ectropion (29.1%), endometrial hyperplastic processes (7.3%). Ectopic pregnancy (4.17%), incomplete uterine prolapse (3.9%), ovarian cysts (3.2%), polyp of the cervical canal (0.6%) were less often diagnosed in the past. Most patients (56%) had a combination of different gynecological diseases in the history.

There is no doubt that old and senile age are characterized by a compilation of chronic diseases. The analysis of endocrine disorders was of particular interest. It was noted that the metabolic syndrome (obesity of 1–4 degree) was observed in 91.4% of patients, thyroid pathology – in 37.5%, type 2 diabetes mellitus – in 21.0% of patients. Diseases of the cardiovascular system (hypertensive disease, ischemic heart disease) were present in 61 patients (40.1%), combined with other extragenital pathology or isolated. Pathology

of the gastrointestinal tract was observed in 28.2% of the examined, cholelithiasis – in 14.5%, kidney stone disease – in 3.2%, breast pathology, including breast cancer – in 15.13%. Most patients had a combination of various extragenital pathologies.

Clinical manifestations of endometrium pathology in the form of blood secretions from the reproductive tract against the background of persistent postmenopause were present in 54 patients (35.5%). Periodic pain at the bottom of the abdomen was noted by 9 patients (7.89%), in one case abundant whites were the reason for a visit to the gynecologist.

It is important to note that in 98 (64.4%) patients intrauterine pathology was suspected during ultrasound in preventive examinations.

In assessing gynecological status, no pathology was found in 107 (70.4%) patients. Atresia of the external orifice of the cervical canal was revealed in 22 (14.7%) patients; in 9 (5.9%) cases, there was an increase of the uterus due to myoma.

All patients were examined using ultrasound with color Doppler imaging. The identified changes are presented in Table 1.

Table 1

Uterine pathology according to ultrasound

Menopause endometrium mismatch	66
Myoma	74
Endometriosis	47
Endomyometritis	32
Endometrium pathology	8
Endometrium polyp	8
Synechiae	6
Suspicion on cancer	1

At the hospital stage, patients (n=152) were scheduled for liquid hysteroscopy according to standard technique on standard equipment under intravenous anesthesia.

During hysteroscopy, 22 patients confirmed atresia of the external orifice, and another 30 showed atresia of the internal orifice, which made it difficult to carry out endoscopic intervention. In these cases (34.2%), the passage of the cervical canal was carried out under the control of the fibrohysteroscope in the expected course, in some cases with aqueous dissection in cervicoscopy. In 5 patients, due to the closed cervical canal along its entire length, it was not possible to pass it. Another 2 patients had a "false passage" (diagnosis of this complication is based on hysteroscopy and lesser pelvis ultrasound data). In 7 cases described, the intervention was stopped due to a high risk of perforation of the uterus. The patients were discharged from the hospital under the supervision of the gynecologist of the polyclinic with dynamic ultrasound screening.

Thus, endoscopic examination of the uterine cavity was carried out to 145 patients. The results of hysteroscopy visualization are presented in Table 2.

Table 2

Uterine pathology according to hysteroscopy

Hysteroscopy data	Abs number	%
Endometrium polyp	79	54.4%
Endometrium atrophy	54	37.2%
Synechiae of the uterine cavity	34	23.4%
Endometrium hyperplasia	20	13.7%
Polyp of the cervical canal	9	6.2%
Chronic endometritis	8	5.5%
Submucous myoma	6	4.1%
Suspicion on cancer	3	2.0%
Adenomyosis	8	5.5%

Pathology in cervico-hysteroscopy was detected in 119 of 145 patients (82.1%).

The removed material was subjected to pathomorphological examination.

The structure of the intrauterine pathology is presented in Table 3.

Table 3

Pathomorphological characteristics of types of uterine cavity pathology

Nosological entity	Abs number	(%)
Total endometrium polyps, of which:	70	46%
Glandular-fibrous endometrium polyp	68	44.7%
Fibrous endometrium polyp	1	0.65%
Glandular endometrium polyp	1	0.65%
Polyp of the cervical canal	9	5.9%
Glandular EHP	3	1.9%
Adenocarcinoma	3	1.9%
Atrophic endometrium	47	30.9%
Leiomyoma	10	6.57%
Chronic endometritis	5	3.28%
Synechiae of the endometrium	8	5.26%

In 21 patients out of 152 (13.8%), only endometrium atrophy was revealed during hysteroscopy and histological examination.

Conclusions

1. The peculiarity of intrauterine pathological processes in elderly and senile patients is their predominantly asymptomatic course, and the diagnosis can be suspected on the basis of ultrasound screening.
2. Patients with HD and obesity require special attention.
3. Anatomical features of the uterus in postmenopausal patients that create difficulties in hysteroscopy are its small size, atrophic tissue changes, and partial or complete atresia of the cervical canal.
4. The most common endometrium pathology in elderly and senile women is endometrium polyps; the frequency of endometrial carcinoma is increased.

Conflict of interest. The authors declare no conflict of interest.

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FEATURES OF THE COURSE OF PREGNANCY AND CHILDBIRTH IN MULTIFETAL PREGNANCY AFTER ART

Altai State Medical University, Barnaul

A.I. Zoteeva

The article describes the results of a comparative analysis of the documentation of multifetal pregnancies and birthgiving of women after assisted reproductive technologies. In the course of studying 63 birth histories in the Maternity Hospital No.2 of Barnaul from 2016 to 2018, the most frequent complications of the analyzed pregnancies and subsequent birthgiving were identified.
Key words: *multifetal pregnancy, assisted reproductive technologies.*

In Russia, there are about 1,700,000 live births annually [1]. Of these, the proportion of carried pregnancies after ART is 0.5% [2]. The introduction of reproductive technologies into practice (stimulation of ovulation, extragenital fertilization) has led to a significant increase in the number of multifetal pregnancies [3]. This is due to the fact that in order to increase the chances of getting pregnant women are more often transfered several embryos or blastocysts rather than one.

Due to the high rate of growth of the number of multifetal pregnancies against the background of ART, the problem of maintaining these patients becomes more and more urgent, as any multifetal pregnancy is associated with certain risks to the mother and fetuses [2, 4].

The objective of the work was to conduct a comparative analysis of the documentation of the course of multifetal pregnancies against the background of ART.

Research tasks:

1. Identify the most common complications in this group of patients.
2. Determine the possible causes of development and the relationship of these complications among themselves.

Materials and methods

The object of the study was the multifetal pregnancy against the background of ART. The subject of the study was 63 histories of childbirth of women with multifetal pregnancy after ART, on the basis of which the comparative analysis made a conclusion about the frequency of complications of these pregnancies. Further, the dependence of two or more complications was revealed. Research and analysis of birth histories for 2016–2018 were carried out on the basis of Maternity Hospital No 2. In Barnaul.

Results

By the comparative analysis method, it was found that the most frequent complications of multiple pregnancy against the background of ART were:

1. Iron deficiency anemia – in 69.8% of cases, while in the Russian Federation this indicator is 42% [4]. 85.7% of pregnant women with anemia were diagnosed with placental insufficiency.
2. Pregnancy-induced edema – in 33.3% of cases; frequent combination of edema with gestational diabetes mellitus (in 32% of pregnant women with edema).
3. Gestational diabetes mellitus – in 28.6% of cases. All pregnant women with a PDNPP complication (6.3%) were diagnosed with GDM.
4. During the 1st screening, 28.6% of pregnant women were diagnosed with low or marginal placentation of one or both fetuses. By the 2nd screening, this figure fell to 15.9%. By the 3rd screening, it was 1.6%. Placental presentation was 23.8% at the time of the 1st screening, 3.2% – the 2nd screening, and 1.6% – the third one.
5. With the threat of termination of pregnancy in the first trimester, 36.5% of women were observed, 39.7% in the second trimester, and 41.3% in the third. Cervical weakness was diagnosed in 31.7%, the correction of the uterine cervix with circular purse suture occurred in 4.8%, and with obstetric pessary in 100% of pregnant women. Shortening of the uterine cervix with no signs of cervical weakness was diagnosed in 15.9% by ultrasound.
6. 96.8% of women performed surgical delivery. In 100% of them, "IVF" was specified in indications to caesarean section.
7. Premature birth occurred in 39.7% of cases. The average delivery time is 36 weeks.

Conclusions

1. The presented data indicate an increased risk of iron deficiency in women with multifetal pregnancy against the background of ART.
2. The combination of "pregnancy-induced edema" and GDM pathologies did not lead to the occurrence of preeclampsia in pregnant women as

a manifestation of endothelial dysfunction.

3. It was established that in women with multifetal pregnancy against the background of ART the risk of premature birth is increased.

Conflict of interest. The authors declare no conflict of interest.

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PREMATURE BIRTH. CAUSES AND CONSEQUENCES DEPENDING ON THE GESTATIONAL PERIOD

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I.M. Zubova, Yu.A. Dudareva

The article describes the results of comparative analysis of the combination of causes in the group of women with realized premature birth and the group of women who gave birth in time. In the course of the study, individual records of pregnant women and the history of their childbirth were analyzed. Risk factors and perinatal prognosis for newborns were determined.

Key words: *premature birth, cervical insufficiency, primary fetoplacental insufficiency, perinatal mortality.*

Premature birth (PB) is one of the main causes of perinatal morbidity, disability, and infant mortality. Despite numerous studies, the frequency of PB in different countries varies from 5% to 18% and does not show a downward trend [1].

Annually, 15 million premature babies are born in the world. In the Russian Federation, the figure is 5–6.5% of all births. In recent years, the frequency of PB has increased as a result of the adoption of new WHO standards, defining PB from 22 weeks of pregnancy.

There are conflicting opinions on issues of PB pathogenesis. It is generally recognized that the majority of perinatal morbidity and mortality is associated with mistakes in the tactics of PB management. The aspects of the PB prognosis, as well as the ways of effective prevention and treatment remain poorly studied. Prematurity significantly impacts the further development of newborns, which has remote effects in the future: disorders of psychomotor development, vision, hearing, chronic lung diseases, cerebral palsies.

All of the above points to the relevance and prospects of studies of premature birth, the complexity in choosing obstetric tactics in case of it.

The purpose of the work was to conduct a comparative analysis of the totality of causes in the group of women with realized premature birth in the period of gestation 22–27 weeks, 31–36.6 weeks, and the group of women who gave birth on time.

Research tasks:

1. Carry out statistical analysis of medical cards of pregnant women and their birth histories for 2016–2019 on the basis of KSBHI "Altai Regional Clinical Perinatal Center DAR", Barnaul.
2. Identify the most significant risk factors by assessing clinical and anamnestic data and gestational period.
3. Assess early neonatal and perinatal mortality.

Materials and methods

A retrospective study of medical cards of pregnant women and their birth histories for 2016–2019 was carried out on the basis of KSBHI "Altai Regional Clinical Perinatal Center DAR", Barnaul. There were 2 groups: the first group (main) included women (n=31) whose pregnancy ended with premature birth at 22–33 weeks of gestation; the second group consisted of women who gave birth on time. The main group was divided into 2 subgroups: the first subgroup included women (n=12) whose pregnancy ended with very early PB in the period of 22–28 weeks of gestation; the second subgroup consisted of women with premature birth in the period of 31–36 weeks. Multifetal pregnancy was the criterion for exclusion from the comparison group.

In the course of the one-step (transverse) analytical research, the medical documentation was studied: history of birth (N 096/u), history of development of the newborn (N 097/u), protocols of autopsy of newborns, medical cards of pregnant women and mothers (form No. 111/u).

In the course of the work, the following was assessed: cervicometry indicators in the I, II, III trimester of pregnancy, fetal anthropometry indicators, human chorionic gonadotropin level indicators, indicators of protein associated with pregnancy, the period of delivery and clinical phenotype (spontaneous, induced) of childbirth, social factors, concomitant extragenital and gynecological pathology in women surveyed, outcomes of pregnancy and childbirth.

Statistical data processing was carried out using modern methods of data processing with an application package, including Excel 2007. The statistical significance of the study results was assessed by various methods taking into account the nature of the feature and the type of distribution. Random variables at normal distribution were noted as the average values ± standard deviation ($X \pm \sigma$). The values of the proportion indicators (the number of patients per

100 examined) were presented in the form $\widehat{P} \pm S_{\widehat{P}}$, where $\widehat{P}$ – the assessment of the proportion; $S_{\widehat{P}}$ – the standard error of the proportion, with the introduction of the Yates's correction for the binary distribution.

Results and discussion

The age of women differed in the main and control groups and was 30.6±5.6 and 26.7±5.5 years respectively (p=0.0067), no significant differences were obtained between subgroups (32.2±5.3 and 29.5±5.7 years; p=0.067).

When comparing the level of education and marital status of women with the realized PB, there were no statistically significant differences between subgroups, most women had secondary vocational education. At the same time, single women with very early PB occurred 3.2 times more, than among PB in the period of 31–33 weeks. In the analysis of social biological risk factors of premature birth, it was revealed that nicotine dependent women were 2.7 times more common in the main group than in the control group (35.5±9.8% and 0%; p=0.01). Analysis of social risk factors between subgroups of the main group showed that nicotine dependent women occur in both the 1st and 2nd subgroups almost at the same frequency (p>0.05).

Among extragenital pathology, hypertensive disease was revealed 4.5 times more likely in women with premature birth than in women who gave birth on time, which is one of the risk factors for the formation of primary placental insufficiency. The analysis of extragenital pathology in women with realized premature birth depending on the gestation period showed that arterial hypertension was found 3 times more often in the 2nd subgroup than in the 1st one. This indicates that endothelial dysfunction was more common in women with premature birth during the gestational period of 31-33 weeks than in women with very early premature birth.

When comparing the main and control groups, we determined that an important risk factor for premature birth is the non-developing pregnancy in a history (p<0.5). It was statistically determined that in women with premature birth, cervical insufficiency in a history was 4 times more likely than in women whose pregnancy was allowed by delivery on time (p<0.05).

It was found that cervical insufficiency was the most frequent complication of pregnancy in women with premature birth compared to women who gave birth on time (41.9±10.1% and 0%; p=0.002). At the same time, surgical correction of cervical insufficiency was carried out in half of the cases, mainly with obstetric pessary (12.9%), cerclage was used only in 6.4% of cases. Comparison of PB and very early PB did not show any statistically significant differences. The cervical insufficiency was revealed with the same frequency. Unmanageable causes of PB, such as detachment of normally situated placenta and preeclampsia, account for almost 25% of the complications.

Cervicometry in dynamics showed that shortening of the uterine cervix is maximum at 24–26 weeks; with very early premature birth, critical shortening of the uterine cervix is recorded late, therefore, cervicometry should be carried out in risk groups on a weekly basis rather than at 3 to 4 weeks.

Perinatal mortality in the main group was 178.6‰, of which stillbirths were 33%, early neonatal mortality – 68.97‰. Comparing very early premature birth and premature birth in the period of 31–33 weeks, it was found with a significant frequency that the perinatal mortality rates are higher, the smaller the mass of a newborn (400‰ 861.9±266.5 g and 5.6‰ 2144.5±574.1 g) respectively. Consequently, the prognosis for newborns with birth weight less than 1500 g is the most adverse for perinatal outcomes (p<0.05). The Apgar score at the first minute in the main group constituted 4.2±2.5, in the control group 7.2±0.7. The Apgar score at the 5th minute in the main group was 5.2±2.6, in the control group – 7.9±0.5. The assessment of newborns in the period up to 28 weeks of pregnancy on the Apgar score for the 1st minute was 2.7±2.1, in the period of 31–33 weeks – 5.1±2.3. At the 5th minute, the indicator was 3.7±2.5 and 6.2±2.3 respectively.

Conclusion

As significant risk factors, the following should be considered: age over 30 years, smoking, cervical insufficiency in a history and during pregnancy, non-developing pregnancy, abortion, arterial hypertension.

Conflict of interest. The authors declare no conflict of interest.

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COMPARATIVE ASSESSMENT OF RETARD TABLETS WITH THE INDAPAMIDE ACTIVE SUBSTANCE IN THE ASSORTMENT OF THE PHARMACY "PAVLOVSKAYA PHARMATSIYA" FROM DIFFERENT BIOPHARMACEUTICAL POSITIONS

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The article presents the influence of indapamide group drugs on the treatment of arterial hypertension. The comparative analysis of indapamide diuretics in the form of retard tablets by manufacturers, additives and bioavailability was carried out. Conclusions about the advantages of the retard tablet drug form for the treatment of arterial hypertension were made.
Key words: *arterial hypertension, diuretics, indapamide.*

Diuretics are drugs that increase the volume of urine excretion and sodium excretion, and therefore they are used to remove excess fluid in patients with arterial hypertension, chronic heart failure, chronic renal failure, and liver cirrhosis [1, 3].

Arterial hypertension (AH) is one of the main risk factors for cerebral stroke, myocardial infarction (MI), along with heart and kidney failure. It occurs in 20–40% of the adult population in many industrialized countries of the world. Among the elderly, the frequency of AH exceeds 50%. The drugs of choice in these conditions are thiazide and thiazid-like diuretics, the latter include indapamide (3-(amino sulfonyl)-4-chloro-N-(2,3-dihydro-2-methyl-1H-indole-1-yl)benzamide), which has been widely applied since 1974. It is known that hydrochlorothiazide at a dose of 100 mg/day increases the risk of sudden death, at doses of 50–100 mg/day does not prevent the development of ischemic heart disease (IHD), and at doses less than 25 mg/day provides the greatest protection against IHD [1, 3, 6]. Based on these data, changes were made to the international and domestic recommendations for the treatment of AH with regard to doses of thiazide diuretics: low doses equivalent to hydrochlorothiazide not more than 25 mg/day are recommended to ensure the greatest organ-protective effect. In accordance with the latest requirements, in 1997, a new drug form of indapamide containing a dose of 1.5 mg – indapamide retard was created [2].

The advantage of indapamide retard in comparison with the traditional form of indapamide is to provide a lasting effect for 24 h with a single dosing per day and stable antihypertensive action with the lowest concentration fluctuations in the blood [2, 3].

Therefore, at present it is important to conduct a comparative assessment of retard forms of drugs with the active substance indapamide.

The aim of the work was to carry out the study and comparative assessment of retard tablets containing the active substance indapamide in AKGUP "Pavlovskaya Pharmatsiya" (the village of Pavlovsk, Altai Krai) by the composition of additives and pharmacokinetic indicators, as well as by manufacturers.

Research tasks:

1. Examine the assortment and conduct a comparative assessment of retard tablets of the indapamide group by manufacturers.
2. Examine the assortment and conduct a comparative assessment of retard tablets of the indapamide group by the composition of additives.
3. Examine the assortment and conduct a comparative assessment of retard tablets of the indapamide group by pharmacokinetic parameters.

Materials and methods

The objects of the study were the drugs of the indapamide group, presented in the assortment of the drugstore AKGUP "Pavlovskaya Pharmatsiya" at the address: Pavlovsk, ul. Raevskogo, 2.

The package inserts of medicinal products and the state register of medicinal products were studied [4].

Results and discussion

The analysis of the assortment of drugs in the form of retard tablets by manufacturers is presented in Table 1.

The analysis of the assortment by manufacturers (Table 1) showed that the assortment is represented by 80% of domestic manufactures and only 20% of foreign ones (Les Laboratoires Servier Industrie, France).

Then a comparative assessment of the drugs

Table 1

Analysis of the assortment of drugs with the active substance indapamide, produced as retard tablets, by manufacturers

No.	Drug	Manufacturer	Country
1	Indapamide retard 1.5 mg N30	OOO "Ozon"	Russia
2	Indapamide retard 1.5 mg N30	ZAO "ALSI Pharma"	Russia
3	Indapamide MV tab. 1.5 mg N30	ZAO "Makiz-Pharma"	Russia
4	Arifon retard 1.5 mg N30	Les Laboratoires Servier Industrie	France
5	Ravel® SR 1.5 mg N20	OOO KRKA-RUS	Russia

presented in Table 1 was carried out by the composition of additives, pharmacokinetic indicators.

In the analysis of the data, it was found that the bioavailability of almost all analyzed drugs is high, 93% on average. Other pharmacokinetic indicators have different values, based on this, it can be concluded that the formulation of additives of different manufacturers, as well as various pharmaceutical factors influence the pharmacokinetic indicators of the drugs considered [4, 5].

Comparing the composition of the auxiliary components of different drugs, we can say that it is similar. Various solvents, diluters, dyes, emulsifiers, lubricants, antibonding agents and others can be used as additives in the production of retard tablets. The coat should dissolve at the action point with the release of the active substance and ensure the duration of action. The coat, as a rule, consists of Opadry II, it includes as a film coating agent – hydroxypropyl methylcellulose, as a plasticizer – polyethylene glycol, giving luster to a tablet in addition to plasticizing action, and triacetin, reducing the foam formation during the suspension preparation in addition to the plasticizing action, pigments – titanium dioxide, as well as polysaccharides – lactose, maltodextrin, polydextrose. In the composition of almost all tablets, lactose (milk sugar) or lactose monohydrate were used as an excipient, it causes the need to advise patients on lactose intolerance, which has increased in recent years [3, 4, 5].

Conclusions

1. In the drugstore AKGUP "Pavlovskaya Pharmatsiya", the assortment of indapamide in the form of retard tablets is widely represented; domestic manufacturers constitute 80%.
2. The composition of auxiliary components of retard tablets of the indapamide group is similar and represented by solvents, diluters, dyes, emulsifiers, lubricants, antibonding agents.
3. Various pharmaceutical factors influence the pharmacokinetic indicators of the drugs studied.
4. Today, retard tablets are an indispensable drug form due to their valuable properties and many advantages, especially in the chronic course of diseases, and find their further development in the pharmaceutical industry.

Conflict of interest. The authors declare no conflict of interest.

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PLOIDOMETRIC DNA STUDY IN DIAGNOSIS OF RENAL CELL CARCINOMA

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This article presents a study of the correlation between the ploidy of nucleus of tumor cells of renal cell carcinoma and some prognosis factors, histological type of cancer. We conclude that the study of such parameter as ploidy can be useful as an additional diagnostic method. This article may be of interest primarily to oncologists, pathomorphologists.
Key words: *ploidometry, renal cell carcinoma, DNA uptake ratio.*

Kidney cancer is one of the most common oncological diseases of the urinary system. Around 250,000 cases are detected in the world annually, with prevalence compared to other diseases being 4.3%.

Kidney cancer is of great social importance because there is a low survival rate after treatment, which is partly due to high resistance to therapy.

Kidney cancer is a heterogeneous group of tumors, the most common among them is renal cell carcinoma, accounting for about 95% of all cases. However, each histological variant is unique from both clinical and morphological points of view.

The study of the relationship between tumor cell ploidy and cancer variants is observed in a small number of research. In such studies, there is a certain pattern of interrelation of ploidy and histological variants, also there is an indication of usefulness for differential diagnostics.

The aim of the work is to improve the diagnosis and assessment of prognosis in renal cell carcinoma on the basis of carrying out of ploidometry.

Materials and methods

In this paper, 115 cases of patients with kidney cancer (renal cell carcinoma) were investigated. The patients were examined and treated at the KSBHI "Altai Regional Oncology Dispensary", Barnaul. There were 55 men (47.8%) and 65 women (52.2%). The average age of patients was 57.8±0.9 years (min. 34; max. 77; av. 51). Ploidometric DNA study was carried out with the help of the image analysis system: PC and VideoTest-Morphology 5.2 Software, Leica DME microscope, Leica EC3 digital camera. When preparing microslides, the Feulgen stain was used.

DNA of nuclei of small lymphocytes was determined to identify the standard ploidy (2c), i.e. diploid chromosome complement. In each slice, about 30 cells were examined. After that, the DNA uptake ratio in tumor cells was determined. Statistical processing of the material was carried out using the Statistica 6.0 package.

Heterogeneity histograms were constructed and classified according to Nenning (1997) to study the distribution of tumor cells by DNA uptake ratio in the population.

Results and discussion

In the study of the relationship between ploidy and sex, it was found that in men and women this indicator was 5.3c and 4.5c respectively.

In the study of the relationship between ploidy and age, it was revealed that the lowest values of the DNA uptake ratio were determined in the age group from 30 to 39 years, the highest indicators were in the group of 60–69 years: 30–39 – 3,9c; 40–49 – 5c; 50–59 – 5c; 60–69 – 5,1c; 70–79 – 4,2c.

In the course of the study of the relationship between ploidy and histological type of RCC, it was found that the highest DNA uptake ratio indices were observed in the granular cell and spindle cell variants of cancer, and the lowest value – in case of papillary cancer: papillary cancer – 4.1c; clear cell cancer – 4.5c; neuroendocrine cancer – 5.1c; chromophobic cancer – 5.4; granular cell cancer – 6.1c; spindle cell cancer – 8.4c.

During the study of the relationship between ploidy and the size of the tumor node, it was established that with the increase of the tumor node, the DNA uptake ratio increased: <7 cm – 3.9c; >7 cm – 6.4c.

In the study of the relationship between ploidy and the presence of metastases, it was determined that in cases of metastases the DNA uptake ratio is more than in cases where metastases are not detected: without metastases – 4.4c; with metastases – 7.1c.

In the course of the study, histograms by Nenning H. et al. (1997) were constructed, the following results were obtained:

Type I histogram: paraploid cells – 5%, diploid cells – 20%, triploid cells – 70% and tetraploid cells – 5% (homogeneous diploid type). This type of histograms includes 34.8% of observations.

Type II histogram: diploid ones amounted to 20%, triploid – 50%, tetraploid – 20%, pentaploid –

6%, hexaploid – 4% (poorly expressed heterogeneous type). This type of histograms includes 20.9% of observations.

Type III histogram: in the studied cells, the ploidy of 2c is characteristic of 3% of cells, 3c – 7%, 4c – 30%, 5c – 10%, 6c – 10%, 7c – 10%, 8c – 10%, 9c – 7%, 10c – 5%, 11c – 5%, 12c – 3% (expressed heterogeneous type). This type of histograms includes 21.7% of observations.

Type IV histogram: in the studied cells, a set of 5c – 10% cells, 6c – 17%, 7c – 13%, 8c – 10%, 9c – 10%, 10c – 10%, 11c – 10%, 12c – 7%, 13c – 5%, 14c – 5%, 15c – 3% (homogeneous aneuploid type). This type of histograms includes 22.6% of observations.

Conclusion

Thus, based on the above data, a conclusion can be made that the DNA uptake ratio is interconnected with sex, age, tumor node size, metastases, histological type of tumor and can be used as an additional factor in diagnostics and prognosis.

During the construction of histograms, it was determined that in RCC the prevalence of tumors with the presence of heterogeneity of cell populations by the DNA uptake ratio was observed.

Conflict of interest. The authors declare no conflict of interest.

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ENT PATHOLOGY IN MESENCHYMAL CONNECTIVE TISSUE DYSPLASIA: CHEILOSCHISIS, POLYPOSIS OF MAXILLARY SINUS

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The article describes the results of the survey using the Beighton score in order to identify the connection between the occurrence of pathology of ENT organs and the degree of joint hypermobility. The study examined the prevalence of connective tissue dysplasia syndrome in people with ENT organ diseases. The article also considers the role of connective tissue dysplasia in the clinical course of diseases such as cheiloschisis and polyposis.
Key words: *connective tissue dysplasia, cheiloschisis, polyposis.*

Due to the increase in the level of hereditary pathology and diseases associated with teratogenic effects on the fetus, great importance is attached to embryogenesis disorders. One such manifestation is connective tissue dysplasia syndrome (CTD), which serves as the basis for the formation of various diseases due to reduced connective tissue strength depending on the organ or organ system involved. The independent clinical significance of CTD syndrome is confirmed by data on high incidence of concomitant pathology.

Variety of clinical symptoms in connective tissue pathology indicates systemic lesion, since connective tissue is found in almost all organs and systems and performs a number of critical functions.

Consequently, defects of fibrous structures and the main substance of connective tissue lead to homeostasis disorder on tissue, organ, organism levels in the form of various morphofunctional disorders that determine the features of associated pathology.

The purpose of the work was to study the prevalence of connective tissue dysplasia syndrome in people with ENT organ diseases, to establish a connection between connective tissue dysplasia and such ENT pathologies such as cheiloschisis and polyposis, as well as to assess the role of the syndrome in the development and clinical course of these diseases.

Research tasks:

1. Identify among respondents those who suffer from mesenchymal dysplasia.
2. Study the prevalence of connective tissue dysplasia syndrome in people with ENT organ diseases.
3. Establish the general regularities and fundamental differences in the clinical course of disorders of face bones union and the development of hyperplastic overgrowth in patients with connective tissue dysplasia syndrome and in patients without clinical manifestations of mesenchymal dysplasia.
4. Justify the possibility of connection between mesenchymal connective tissue dysplasia, cheiloschisis, and polyposis.

Materials and methods

The study included 112 patients being in follow-up by the otorhinolaryngologist in one of the polyclinics of Barnaul.

Questionnaire was chosen as the method.

Both subjective (history data, questionnaire materials) and objective data from examination methods (physical examination, instrumental studies, allergological tests, X-ray diagnostics) were taken into account.

The correctness of the diagnosis was confirmed by examination of the otorhinolaryngologist, including during the recrudescence, and an allergic examination to identify a specific allergen in polyps.

Inclusion criteria were the following:

Age from 18 to 78 years;

Presence of 5 or more phenotypic signs of CTD;

Informed consent of the studied.

Exclusion criteria were the following:

Age <18 and >78 years;

Less than 5 phenotypic signs of CTD.

The age of the respondents averaged 37.2±3.6 years.

Statistical analysis of the obtained results was performed using the standard package of Microsoft Office 2003 programs for personal computers. Standard processing of variation series included the calculation of arithmetic mean values (M), standard deviations (m). Comparison of variation series was carried out using the Student's t-test (t). The Pearson correlation coefficient (r) was calculated to determine the correlation relationship between the studied indicators.

Results and discussion

Group A included patients who had a Beighton score of 4 or more at the time of examination or in the past.

The phenomenon studied	Group A n=71	Group B n=41
Asthenic constitution with weight deficit	61	40
Disorders of structure and function of the spine, expressed in scoliosis and thorax deformation	63	25
Foot pathology	58	39
Pathology of the cervical vertebrae	47	17
Vascular disorders	68	32
Immunologic disorders	54	28
Hyperextensibility of skin	47	23
Hypermobility of joints	81	24
Disturbed occlusion	60	22
Nervous system disorders	57	24
Slight bruising	79	27
Nosebleed	34	21
Dysplastic phenomena associated with ENT organs	23	5
Cheiloschisis	5	0
Polyposis	16	3

Accordingly, group A was experimental.

Group B included patients who had a Beighton score less than 4.

Accordingly, in group B, the respondents were not "dysplasts", and this group was control.

The percentage of connective tissue dysplasia among both groups amounted to 64.2.

The analysis of the data makes it possible to distinguish clinical and anamnestic signs indicating immune disorders in 48.2% of patients of group A.

The functional state of the immune system in CTD is characterized by both the activation of the immune mechanisms that ensure the maintenance of homeostasis and their insufficiency leading to impaired ability to adequately release the body from foreign particles and, therefore, to the development of recurrent infectious inflammatory diseases.

For example, frequent colds, sinusitis, rhinitis, in which the mucous is subjected to inflammation and further hypertrophy, can provoke increased growth of polyps, which represent themselves hyperplastic overgrowth being a kind of productive inflammation.

Immunologic disorders in some patients with CTD include increased blood level of immunoglobulin E, which is known to be an indicator of allergy. The addition of an allergen to IgE protein causes the production of histamine and serotonin which cause allergy.

This explains the fact that the survey revealed a tendency to occurrence of allergic polyps in respondents. As a percentage, this was 67% of the total number of polyps.

"Defective" collagen fibers and glycoproteins lose their structure faster when exposed to various adverse factors that are inherent in the inflammatory process occurring against the background of genetically induced structural disorders of connective tissue.

With reference to the subject above, there is a connection between connective tissue dysplasia and the formation of white polyps based on the fibrous tissue. As a percentage, the proportion of white polyps is 16% of the total number of polyps.

Since white polyps tend to grow, they can be closely interconnected with vessels. It is for this reason that a polyp can bleed.

Thus, we can make a connection between the formation of white polyps and the increase in the number of nosebleed in group A.

Since cleft palate, harelip, and mesenchymal dysplasia are genetically deterministic anomalies, it is possible to assume that the detection of pathology in mesenchymal dysplasia is more frequent; but as this pathology is rare (1 child with the pathology per 2500 born without this pathology), due to the small number of respondents, it is possible only to allow a connection between connective tissue dysplasia and cheiloschisis, based on the fact that these states are both genetically deterministic and can be combined, so there are other dysplastic phenomena associated with ENT organs.

Conflict of interest. The authors declare no conflict of interest.

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ANTENATAL FULL-TERM FETAL DEATH: RISK FACTORS, POSSIBILITIES OF TELEMEDICINE IN ITS PREDICTION

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The article describes the risk factors of antenatal full-term fetal death, revealed in the course of clinical and statistical analysis of two groups of women. A scale for assessing the risk of antenatal fetal death has been developed. The analysis of its effectiveness was carried out with the help of telemedicine technology – the automated workplace of the doctor "Register of pregnant women" after the introduction of the risk assessment scale.
Key words: *antenatal fetal death, risk, analysis.*

Antenatal full-term fetal death is the fetus death in the womb from week 37 day 1 to week 42 of gestation [2]. Antenatal mortality rate directly depends on the social and economic status of mothers and the state of obstetric service [1]. Antenatal losses are characterized by multiple risk factors and low diagnosis of causes [3].

The work objective: prediction of the full-term antenatal losses on the basis of the identified risk factors with the help of telemedicine technology "Register of pregnant women".

Tasks:

1. Identify clinical and anamnestic risk factors of antenatal death of the fetus during a term pregnancy.
2. Evaluate the effectiveness of the scale of assessment of a full-term fetus death risk on the basis of telemedicine technology "Register of pregnant women".

Materials and methods

To solve the first task, two experimental group were selected:

Group I – 54 women who had cases of antenatal full-term fetal death.

The control group included 200 women and their live full-term newborns born with an Apgar score of 8 or more.

To solve the second task of our research, group II was created – 58 women who had cases of antenatal full-term fetal death after the development and introduction of a prognostic risk scale in the "Register of pregnant women".

The groups were compared according to the following criteria: age and social characteristics, bad habits, somatic and obstetric-gynecological history, peculiarities of pregnancy, condition of the fetoplacental complex in the third ultrasonic screening.

Based on the identified risk factors, a table for calculating the risk of antenatal full-term fetal death was drawn up. After the introduction of the scale, the work of the "Register of pregnant women" was analyzed. Methods of statistical processing were used depending on the type of random variables and the task of the study [4, 5].

Results and discussion

Clinical and anamnestic risk factors for antenatal losses during preterm pregnancy included: young age (OR 5.0; 95% CI 1.29–19.31), vocational professions (OR 4.6; 95% CI 2.33–9.33), persistent nicotine dependence (OR 2.6; 95% CI 1.11–6.15), hypertensive syndrome (OR 2.8; 95% CI 1.15–7.14), chronic specific infections (OR 8.2; 95% CI 1.98–34.00) in mothers (syphilis, tuberculosis, hepatitis C), anemia (OR 2.0; 95% CI 1.06–3.92), urinary infections (OR 3.5; 95% CI 1.23–10.35), and reproductive tract infections (OR 2.3; 95% CI 1.17–4.61). Significant ultrasonic criteria in prognosis of antenatal losses included polyhydramnios and placenta thickening (46.3% and 42%, respectively, $p<0.001$), reduction of fetal cardiovascular system reactivity according to CTG (18.5%; $p<0.001$), but none of them occur in more than half of the observations.

In the course of the study after the development and introduction of the risk scale in the telemedicine program – the workplace of the obstetrician-gynecologist "Register of pregnant women", the dynamics of clinically significant characteristics was found among patients of group II in relation to experimental group I: increase in the number of women of elder reproductive age (62.1% vs. 22.2%, $p<0.001$) and decrease in young mothers (1.7% vs. 9.3%, $p<0.001$), decrease in the frequency of endocrinopathy (12.1% vs. 29.6%, $p<0.05$), increase in reproductive tract infections during pregnancy (65.5% vs. 31.5%, $p<0.001$) with more rare detection of polyhydramnios (10.3% vs. 46.3%, $p<0.05$).

The introduction of the prognostic risk scale for full-term antenatal losses led to a decrease in the indicator of antenatal mortality in Altai Krai by 18.7%. This indicates an adequate assessment of obstetric and perinatal risk in dispensary

observation and rational routing of pregnant women according to the degree of risk.

Conclusions

1. A severe obstetric and gynecological history does not belong to the risk factors of antenatal fetal death, the most important are bad habits, chronic somatic pathology (hypertension, specific infections, anemia).
2. The prognostic scale of the risk of antenatal fetal death during a term pregnancy demonstrates insufficient informativeness of functional methods for assessing the condition of the intrauterine fetus.
3. The developed scale of assessment of the risk of full-term antenatal losses does not allow to significantly reduce their share in the structure of perinatal mortality, but makes it possible to provide rational routing of pregnant women of risk groups to obstetric institutions of the appropriate level.

Conflict of interest. The authors declare no conflict of interest.

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MANIFESTATION OF MESENCHYMAL CONNECTIVE TISSUE DYSPLASIA IN WOMEN WITH MENSTRUAL DYSFUNCTION

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The article describes the results of the study aimed at identifying the connection between menstrual cycle disorders and congenital connective tissue deficiency. Women included in groups on the criterion of presence of undifferentiated phenotypic and visceral signs of connective tissue dysplasia, menstrual ovarian dysfunction in the history were interviewed.
Key words: *connective tissue dysplasia, menstrual dysfunction.*

The menstrual function reflects the health of a woman in general, since the regulation of the menstrual cycle (MC) is achieved by coordinated work of ovaries, pituitary gland, hypothalamus, cerebral cortex, and thyroid gland. The high frequency of MC disorders is due to the particular vulnerability of the hypothalamic-pituitary-ovarian system due to its hypersensitivity to various adverse effects, dysembryopathy, endogenous and exogenous stimuli.

The aim of the work was to determine the relationship between the MC violation with undifferentiated connective tissue dysplasia (UCTD) and their impact on women's health, to identify significant UCTD markers, their frequency in persons with menstrual dysfunction.

Materials and methods

The work is based on the results of the survey.

The inclusion criteria for the survey group were the presence of undifferentiated phenotypic and visceral signs of connective tissue dysplasia, menstrual ovarian dysfunction in women. The data of the survey tables were analyzed.

They included the condition of the skin, trunk, hands, spine, hypermobility of joints, feet, hemorrhagic symptoms, the presence of varicose veins of the lower limbs.

Results and discussion

The analysis of clinical and anamnestic data showed that the age of the participants of the study varied from 18 to 46 years. The average age of the women surveyed in the groups was 29 years. A study of their social status showed that the occupational distribution had no significant differences between groups. The analysis of anthropometric data shows that asthenic and hypersthenic type of constitution prevailed in patients in group A, while normosthenic and hypersthenic type of constitution prevailed in group B.

External phenotypic markers of CTD were significantly more common in the main group A: disorders of the structure of the spine, hernia of various localizations, myopia, flat feet. The analysis of CTD visceral manifestations also revealed significant differences. In women of group A, CTD markers were observed: vegetovascular dystonia, anomalies of the cardiovascular system, anomalies of the urinary system, chronic bronchopulmonary pathology, anemia. In the comparison group, these signs were found 2-3 times less frequently.

Diagnosed MC disorders were revealed in group A women both in isolation and in common. Combined violations of MC parameters in the form of a complex of two or more symptoms prevailed. In the history of patients with MC disorders and UCTD, there was a high incidence of juvenile uterine bleeding (JUB). According to the literature, JUB are caused not only by hormonal disorders, but also by the tendency to hemorrhagic manifestations of CTD syndrome.

According to most researchers, within the group of menstrual cycle disorders, juvenile bleedings have given way to the hypomenstrual syndrome and amenorrhea. This indicates more serious functional abnormalities of the reproductive system than in previous years. Most often, the patients complained about rare, scanty, short periods.

Somatic health in women with UCTD, with history of oligomenorrhea, uterine bleedings of puberty, and dysmenorrhea, is significantly more burdened with extragenital diseases.

All of the above cannot but affect the implementation of reproductive plans in women with MC disorders and CTD. For gynecological diseases, the study participants in groups A and B had such pathologies as erosion and dysplasia of the uterine cervix, endometriosis, uterine fibroids in both groups were the same, but in group A degenerative forms of tumor growth prevailed, and infertility in group A was twofold.

In literature, there is information about MC

violations in women of reproductive age with CTD, but specific forms of violations, unfortunately, are not specified. Nearly a third of persons combined UCTD with manifestations of hypothalamic syndrome. Therefore, the question of mechanisms of development of MC disorders in women with CTD remains open and important, since menstrual dysfunction is pathognomonic for gynecological pathology and the presence of CTD aggravates its current.

Thus, according to the literature, pelvic pain syndrome can be explained by the concomitant varicose veins of the lesser pelvis in patients with UCTD. Genital prolapse is also found in women of reproductive age with CTD, and it has been proven that traumatic birth is not a cause in this case. The descent of the genitals is associated with generalized CTD and develops the earlier the manifestations of dysplasia in the body are more pronounced. In the same patients, different forms of urination disorders are described: urinary incontinence, frequent urination, difficult urination prevailed. Moreover, the urodynamic examination showed that the basis of these functional disorders is not the dislocation of the vesicourethral segment due to the pelvic diaphragm damage, but neurogenic dysfunction of the vesicourethral segment and pelvic diaphragm.

The obstetric history of the studied is of interest. The relevance of the study of MC disorders and CTD in obstetrical and gynecological practice is determined by the fact that these conditions can be the basis of urgent situations (hypotonic bleedings), increase the frequency of complications of pregnancy and lead to reproductive losses (miscarriage).

For example, a study on the outcomes of pregnancy and childbirth in women with MC disorders and CTD revealed a high incidence of spontaneous miscarriage. More than half of them occurred in the first trimester of pregnancy due to cervical insufficiency (which, apparently, is due to a violation of the structure of connective tissue fibers). Pregnancy in more women with UCTD ended with premature birth.

Seeing the relationship of MC disorders and CTD with endocrine and somatic disorders, it is necessary to determine the pathognomonic characteristics of UCTD in these patients. Thus, according to the A.S. Kalmykova score assessment, the most common and characteristic signs of CTD in violations were revealed, on the basis of this a survey form was drawn up, the results are presented in Table 1.

Table 1

Dysembryogenic stigma – sign of CTD	Group A, n=30	Group B, n=30
Pronounced venous network	10	5
Vision impairment	15	7
Abnormality of bite	4	1
Protruding ears	5	3
Skin pallor	18	10
Hyperextensibility of skin	15	3
Hypermobility of joints	25	-
Thin, wrinkled skin	5	2
Asthenic	10	5
Scoliosis	14	9
Hernia	5	1
Nosebleed	8	3
Slight bruising	10	2
Valgus feet (X-shaped foot position)	4	-
Instability of the cervical vertebrae	2	-
Postural disorder	20	10

Conclusions

1. According to a number of authors, there is a clear connection of menstrual disorders with congenital inferiority of connective tissue.
2. Taking into account the wide range of manifestations of CTD in women with MC disorders, regardless of the immediate cause of their visit to a doctor, it is necessary to predict the dynamics of the disease and the risk of possible complications.
3. Verification of CTD in patients should be considered an extremely serious problem due to the high probability of developing situations that pose a vital threat during pregnancy and childbirth to the mother and fetus.
4. Timely recognition of UCTD will improve

the effectiveness of treatment of MC disorders, prevent adverse outcomes, especially in obstetric and gynecological practice.

5. Further research is needed to clarify the pathogenetic mechanisms of development of this disease in this category of patients and to develop rational therapy.

Conflict of interest. The authors declare no conflict of interest.

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ON THE POSSIBILITY OF LEARNING ENDOCRINOLOGY IN THE SIMULATION CENTER

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The article presents the reasoning on the possibility of learning endocrinology in the simulation center, based on both literature data on this issue and our own practical experience.
Key words: *endocrinology, simulation training, continuing professional education.*

Simulation training, the purpose of which is to train students and doctors in the conditions most approximate to reality, is dynamically developing at present both in institutions of higher education and in medical colleges.

During the learning period at the university, it is impossible to study all required nosology in practice. Simulation training allows to create conditions for learning and training of practical skills, while reducing the level of stress in students due to the fact that mistakes at this stage of training do not entail consequences for the life and health of the patient.

The aim was to study the possibility of improving the professional training of students and (young) endocrinologists through the use of simulation training.

Tasks: to study the methodology and experience of organizing simulation training in domestic and foreign literature in general and directly in endocrinology, to develop situations and checklists for training some practical skills in this specialty, to check in practice.

Materials and methods

During the development of the trainings, domestic and foreign literature sources were analyzed both about the organization of simulation training in general and about such experience in endocrinology in particular. When compiling checklists, clinical recommendations were used allowing to simulate the correct clinical and laboratory picture and determinative tactics of the doctor, as well as materials of the Methodology Center of Specialist Accreditation, thanks to which the main points and sequence of actions of the doctor were taken into account both in the provision of emergency medical care in hospital conditions and in the planned outpatient care.

Results

Received checklists of stations "Differential diagnostics of coma occurring in endocrine pathologies" and "Differential diagnostics in arterial hypertension syndrome" were tested in practice during the "Simulation battles" of ASMU, which allowed to check their correctness and assimilation of the material in students' self-training, to identify and correct the mistakes made by the organizers at drawing up checklists and participants when passing stations.

Conclusion

Simulation training allows to create numerous clinical situations, allowing both to train practical skills and to help in the formation of clinical thinking. In addition, it facilitates the transition of students and young professionals from theory to practice "at the bed of the patient" by reducing stress and making the necessary skills automatic. When organizing simulation training, it is important to follow the methodology that allows to achieve significant involvement of students' intellect in the practice, improvement of creative activity, and not mechanical skills development according to the previously known algorithm presented in the checklists. This is also facilitated by the availability of a large number of scenarios of simulated situations.

Conflict of interest. The authors declare no conflict of interest.

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ANALYSIS OF THE DESCRIPTION OF WOUNDS OBTAINED FROM THE IMPACT OF SHARP OBJECTS IN CORPSES IN BARNAUL FOR 2012-2017

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The article is devoted to the description of wounds obtained from the impact of sharp objects in corpses. The archival material of the Barnaul morgue "Altai Regional Bureau of Forensic Medicine" for the period from 2012 to 2017 was used. A detailed analysis of morphological characteristics of wounds obtained from sharp objects in corpses during this period of time with subsequent comparison and identification of compliance with Order N 346n from 12.06.2010 "On approval of the procedure for the organization and production of forensic medical examinations in state forensic institutions of the Russian Federation" is presented.
Key words: *forensic medicine, description of wounds, sharp objects.*

In forensic medical practice, the determination of the injury nature and its formation mechanism is based on a detailed description of the damage to the full extent, which also allows obtaining necessary factual data for subsequent identification of specific, group or individual signs of the damaging object and reconstruction of incident circumstances [1, 2, 3, 4, 5]. For this purpose, in the examination of the corpse in cases of detection of injuries, their type, exact anatomical location, shape, dimensions, direction along the axis of the body, the nature of edges and ends, the presence of the canal and the other morphological features specified in normative legal acts constituting the legal basis of forensic medical activity are indicated [1, 4].

The research objective was to compare and identify the correspondence of the description of wounds from the impact of acute objects to Order N 346n of 12.06.2010 "On approval of the procedure for the organization and production of forensic medical examinations in state forensic institutions of the Russian Federation".

Materials and methods

We analyzed the archival material of the Barnaul morgue KSBHI "Altai Regional Bureau of Forensic Medicine" for the period from 2012 to 2017.

Results and discussion

During the period under study, 16165 examinations of corpses were carried out, including 4388 cases of violent death (27.1%). We studied 854 examinations, of which 663 (77.6%) were examinations of male bodies and 191 (22.4%) of female bodies. A total of 2200 wounds were analyzed (wounds with a common description were combined – this group was considered as one), of which 1354 (60.5%) were obtained from exposure to solid blunt objects and 846 (39.5%) – to sharp ones. Wounds obtained from exposure to sharp objects were distributed as follows: 523 (61.8%) stab and cut wounds, 296 (35%) cut wounds, 22 (2.6%) chop wounds, 3 (0.4%) sawn wounds, 2 (0.2%) stab wounds.

The analysis of the description of 846 wounds obtained from the impact of sharp objects revealed the following: in 756 (89%) cases, the form of wounds was specified, in 814 (96%) – their size, in 736 (87%) – orientation, in 742 (88%) – the edges of wounds are described, in 741 (88%) – the ends, in 646 (76%) cases, it is indicated what the bottom of wounds is. In the description of 523 stab and cut wounds, 312 (60%) cases measured the distance from the foot plantar surface and from the median line to wounds, 467 (89%) cases described the edges of wounds, 475 (90.8%) – the ends, 242 (46%) – the walls of wounds, in 314 (60%), there was a hemorrhage. In the description of the wound canal, in 483 (92%) cases its depth was indicated, in 431 (82%) cases it was noted what the bottom of the wound of the wound canal is (where it was indistinctly terminated/interrupted), in 451 (86%) cases the direction of the wound canal was indicated. Only 178 (34%) skin flaps with stab and cut wounds were sent to the medical forensic department for further additional research.

Conclusion

In the description of wounds by doctors forensic experts, their size and shape, edges, ends of wounds, and orientation are almost always indicated. However, signs such as the condition of the walls, the depth and bottom of wounds, the presence of hemorrhages are described much less frequently. Thus, Order N 346n of 12.06.2010 "On approval of the procedure for the organization and production of forensic medical examinations in state forensic institutions of the Russian Federation" is not always fully complied with,

which in the future may adversely affect the restoration of the full picture of the incident circumstances.

Conflict of interest. The authors declare no conflict of interest.

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INTERRELATION OF POLYCYSTIC OVARY SYNDROME AND MESENCHYMAL DYSPLASIA

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The article describes the results of the comparative analysis of women of childbearing age with the diagnosis of polycystic ovary syndrome with signs of mesenchymal dysplasia and women without obvious manifestations of signs of mesenchymal dysplasia. In the course of the research, the information about the heredity of all patients, the presence of certain signs of mesenchymal dysplasia, asthenoneurotic syndrome were studied.
Key words: *polycystic ovary syndrome, mesenchymal dysplasia, connective tissue.*

The basis of polycystic ovary syndrome (POS) is chronic anovulation, which is caused by the hyperproduction of androgens and increase of their conversion into estrogens, especially in the adipose tissue and liver. Estrogen excess leads to a violation of cyclicity and ratio of hypophysis gonadotropic hormones, which also supports anovulation. The luteinizing hormone (LH) increasing influence on the ovaries causes hyperplasia of the internal theca of follicles tissue, which contributes to the further increase of androgen production. Under the influence of androgen excess, the outer surface of the ovaries is thickened. The matured follicles present in it cannot break down to release the egg, instead they increase in size and fill with liquid, that is, turn into cysts.

The purpose of the work was to assess the role of connective tissue dysplasia during the disease.

Research tasks:

1. Study information about the heredity of patients in two groups.
2. Identify signs of mesenchymal dysplasia during samples and interviews, assess signs of asthenoneurotic syndrome.
3. Analyze the results and draw conclusions.

Materials and methods

42 patients diagnosed with polycystic ovary syndrome aged 18 to 37 years were interviewed by means of a questionnaire.

According to the results, the patients were divided into two groups:

Group 1 (main): 16 patients with manifestations of connective tissue dysplasia;

Group 2 (comparison): 26 patients without significant manifestations of connective tissue dysplasia.

Results and findings

Information about heredity in group 1 (main).

Parents retain youthfulness that does not correspond to the passport age:

Father – 7%, mother – 10%, both parents – 2%.

In the family, there are special skills corresponding to hypermobility (wiggling one's ears, particular flexibility) or the usual semiluxation of joints:

Father – 20%, mother – 9%, siblings – 16%.

In the family, there are phenomena of splanchnoptosis (falling of kidney, stomach, etc.):

Father – 8%, mother – 22%, siblings – 19%.

In the family, there are facts of prolapse of mitral valve or supplemental chords of the heart:

Father – 5%, mother – 7%, siblings – 10%.

Among the signs of connective tissue dysplasia, the following were the most common in group 1 (main) patients diagnosed with polycystic ovary syndrome:

Cysts of different localization – 87%,

Spine scoliosis – 78%,

Flat feet – 71%,

Problems with the cervical vertebrae – 60%,

Vegetovascular dystonia – 53%,

Wisdom teeth – 52%.

Information about heredity in group 2 (comparison).

Parents retain youthfulness that does not correspond to the passport age:

Father – 6%, mother – 4%, both parents – 0%.

In the family, there are special skills corresponding to hypermobility (wiggling one's ears, particular flexibility) or the usual semiluxation of joints:

Father – 3%, mother – 1%, siblings – 6%.

In the family, there are phenomena of splanchnoptosis (falling of kidney, stomach, etc.):

Father – 5%, mother – 10%, siblings – 14%.

In the family, there are facts of prolapse of mitral valve or supplemental chords of the heart:

Father – 4%, mother – 3%, siblings – 7%.

Among the signs of connective tissue dysplasia, the following were the most common in group 2 (comparison) patients diagnosed with polycystic ovary syndrome:

Cysts of different localization – 78%,

Spine scoliosis – 60%,
Flat feet – 56%,
Problems with the cervical vertebrae – 55%,
Vegetovascular dystonia – 53%.

Conclusion

To date, there is no scientific evidence of the relationship between polycystic ovary syndrome and connective tissue dysplasia. However, based on this study, the relationship can be traced, because patients with polycystic ovary syndrome show signs of connective tissue dysplasia, most often such as cysts of different localization, spine scoliosis, flat feet, problems with the cervical vertebrae, wisdom teeth, vegetovascular dystonia, free adduction of the thumb to the forearm.

Conflict of interest. The authors declare no conflict of interest.

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POSSIBILITIES OF USING GERD-Q AND PEDSQL QUESTIONNAIRES IN THE DIAGNOSIS OF GERD IN PEDIATRICS

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53 school-age children diagnosed with gastroesophageal reflux disease, established on the basis of a comprehensive clinical and endoscopic examination, including 31 children with erosive and 22 with non-erosive forms of disease were examined. It is shown that the average score when using the Gerd-Q questionnaire in the group of patients with erosive GERD is significantly higher than in the group with non-erosive GERD.
Key words: *gastroesophageal reflux disease, children, erosive esophagitis, Gerd-Q, quality of life.*

Recent years have been characterized by an increase in esophagus pathology (GERD) in both adults and children. Treatment of GERD, especially in childhood, is a difficult task due to the high prevalence, the need for complex endoscopic examinations, the choice of control methods of therapy effectiveness. Therefore, the survey is one of the currently important methods of diagnosis and control of the disease in children's practice, and the search for a questionnaire the results of which would be are as close as possible to the ones in endoscopy becomes the task of scientific research. Recently, the Gerd-Q questionnaire has become topical in the diagnosis of GERD; it was initially proposed for the therapeutic cohort of patients, and then for the pediatric practice. In Russia, the translation and adaptation of the Gerd-Q questionnaire for children was carried out at the Research Institute of Medical Problems of the North of the Siberian Branch of the Russian Academy of Medical Sciences (Krasnoyarsk). In order to determine the severity of the disease, its prognosis, and the effectiveness of certain types of its therapy in pediatrics, attempts were made to assess the quality of life of patients by questionnaire (PedsQL). Thus, the study of the possibility of using questionnaires in the diagnosis of GERD in pediatrics is an urgent task.

Research objective: to study the possibility of using the Russian version of the Gerd-Q questionnaire and the PedsQL questionnaire in detecting and diagnosing the severity of GERD in children's practice.

Research tasks:

1. Identify and statistically prove the pattern between the total score on the Gerd-Q questionnaire and the presence of erosions in the esophagus.
2. Establish a relationship between the severity of GERD determined by the Gerd-Q questionnaire and the presence of erosions in the esophagus.
3. Identify the relationship between the score on the PedsQL questionnaire and the severity of organic damage to the esophagus.
4. Establish a relationship between the severity of GERD and the quality of life.

Materials and methods

The study included 53 children of school age (average age 12.7±0.3 years) who were treated in the gastroenterological department of the KSBHI "Children's City Hospital No. 1" from September to December 2018. Inclusion criteria are the following: primary inpatient examination; suspicion of GERD in referral to hospitalization and its confirmation during examination; absence of planned antisecretory therapy 3 months before hospitalization (a one-time intake of antacids/proton pump inhibitors for heartburn and pain was allowed); informed consent of the patient. All children were examined according to branch standards. Based on the results of the fibrogastroduodenoscopy, 2 groups were formed: erosive GERD (31 children) and non-erosive GERD (22 children). In accordance with the research objective, the Gerd-Q questionnaire adapted for children's age by the Research Institute of Medical Problems of the North of the SB RAMS and the PedsQL questionnaire for determining the quality of life were applied. The F-test and Mann-Whitney test were used to assess the statistical validity. Programs Biostat 4.0, Statistica 6.0 of the StatSoft company, MicrosoftExcel were used.

Results and discussion

According to the results of the Gerd-Q questionnaire, 18 (58%) children reached a diagnostically significant score (8 points) in the group with erosive GERD. The average score was 7.16±0.43. In the group with non-erosive GERD, only 5 children (23%) scored 8 points or more. The average score in the group with non-erosive GERD was lower by 2 points and amounted to 5.36±0.54, the differences between points in the groups were statistically valid (p=0.013, F-test). In addition,

according to the answers to questions 5 and 6 of the questionnaire, two subgroups of patients with GERD were identified in each group: with a mild disease (less than 3 points for questions 5-6) and with a severe disease (3 points or more). In the group with erosive pathology, 8 children (25.8%) reached the result of 3 points; in the group with non-erosive pathology – 8 children (36.4%), statistical differences were unreliable (p=0.5, F-test). Thus, the number of Gerd-Q points in patients with erosive pathology is significantly higher than in patients with non-erosive pathology, and the severity of the course of GERD determined by the questionnaire does not depend on the severity of organic changes in the esophagus.

When comparing the quality of life according to the PedsQL questionnaire, the aggregate estimate (the sum of points of physical, emotional, social, and role functioning) was used for statistical processing. In children with the erosive form, the total indicator of quality of life was 70.4±2.2 points. In children with the non-erosive form, it was more significantly reduced and constituted 62.6±2.8 points. Differences between the quality of life of patients with erosive and non-erosive forms of GERD were statistically reliable ($U_{emp.}$=232, which corresponds to the interval $U_{0.01}$-$U_{0.05}$ in this sample volume (p<0.05), Mann-Whitney test). Thus, the quality of life of children with non-erosive GERD is statistically significantly lower than that of children with erosive GERD.

To clarify the effect of the severity of GERD on the quality of life, subgroups of patients proposed by the Gerd-Q questionnaire were used. In children with mild GERD, the average quality of life was 66.1%+/-5.6%, with severe – 68.1%+/-3.8%. The third group included children who did not score 8 points, their quality of life amounted to 66.1%+/-5.6%. With the Mann-Whitney test, no statistically significant differences were identified in any of the subgroups. Thus, it was established that the severity of Gerd-Q GERD does not affect the quality of life of patients.

Conclusions

1. School-aged children with erosive lesions of the esophagus are more likely to have positive results (8 or more points) of the Gerd-Q questionnaire – 58%, the average score in this group is also significantly higher and amounts to 7.16±0.43 points. This questionnaire can be recommended for screening of child population and patient selection for endoscopic examinations to detect erosive esophagitis.
2. The quality of life in GERD patients does not depend on the severity of erosive changes in the esophagus. There is a statistically significant deterioration of the total indicator of quality of life (62.6±2.8 points) in patients with non-erosive forms of GERD in comparison with patients with erosive GERD (70.4±2.2 points).
3. Severity of the course of GERD determined by the Gerd-Q questionnaire does not reflect the histological state of the esophagus wall and does not affect the quality of life of the patient.

Conflict of interest. The authors declare no conflict of interest.

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CAR INJURY: PROBLEMS OF DIAGNOSTICS; ANALYSIS OF EXAMINATIONS IN BARNAUL (2012-2017)

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The article describes the results of a statistical analysis of death data in cases of car injuries. In the course of the study, the archive material of the morgue of Barnaul was used. The dynamics of mortality, the frequency of occurrence of characteristic morphological signs in a car injury was determined.
Key words: *car injury.*

A fatal car injury traditionally takes one of the leading places among all fatal mechanical injury [1]. Forensic examinations conducted in respect of a fatal car injury are one of the most complex as the investigating authorities and the courts make increased demands for them due to the difficulties of investigation of an accident. According to available literature data, as a result of a fatal car injury in Barnaul in 2007-2008, 232 people died, accounting for 4% of all conducted studies of corpses (5741), 9.8% – of all violent death (2366), and 27.2% – of mechanical injury (852) [2]; in 2009-2010, 124 people died, accounting for 2.3% of the total number of conducted studies (5391) and 17.2% of fatal mechanical injury (721) [3]; in 2011-2012, 169 people died – 3.5% of the total number of conducted forensic medical examinations (expertises) of corpses (4886), 9.8% – of violent death (1709), and 17.4% of mechanical injury (970) [4].

The purpose of the work is to get an idea of the structure of a fatal car injury due to death in the conditions of a road traffic accident in Barnaul for the six-year period (2012–2017).

Research tasks:

1. Examine the expert's conclusions in cases of a car injury.
2. Obtain generalized death rates in cases of a car injury.
3. Determine the frequency of occurrence of morphological signs characteristic of a car injury.

Materials and methods

In the analysis of fatal car injuries, the following data were taken into account: place of death; sex and age of the dead; category of the road user; presence of crossing the human body; presence of ethyl alcohol in the blood of the dead and the degree of alcohol intoxication; the main and immediate causes of death; the areas of injury of the body; the frequency of occurrence of injuries to the soft tissues, internal organs, great vessels, and skeletal bones.

Results and discussion

During the study period, 16165 examinations of corpses were carried out. Concerning violent death, 4388 examinations were conducted (of the total number of examinations of corpses); from them, 1574 (35,9% of the total number of violent death) – fatal mechanical injuries. The number of fatal car injuries was 397 (25.2% of the total number of fatal mechanical injuries, 9.0% of all violent deaths, and 90.4% of all fatal road accidents). The distribution of the number of fatal car injuries by year is as follows: in 2012 – 87 (21.9%) cases, in 2013 – 96 (24.2%), in 2014 – 63 (15.9%), in 2015 – 62 (15.6%), in 2016 – 39 (9.8%), in 2017 – 50 (12.6%).

Most often, people aged 18–44 die from car injuries – 160 men, 38 women; 45–59 years – 68 men, 27 women. Older people die a little less often: 60–74 years old – 31 men, 23 women; 75–90 years old – 14 men, 23 women; over 90 years old – 1 woman. Up to the age of 17, 8 boys and 4 girls died during the study period. That is, in terms of age, there is a high percentage of mortality among persons of working age, and the number of men who died as a result of road accidents more than twice dominates the number of women died: 281 (70.8%) and 116 (29.2%) cases respectively.

Depending on the type of vehicle involved in the accident, fatal cases of road injuries were distributed as follows: passenger car – 261 cases (65.7%), lorry – 26 (6.5%), vehicles of wagon setup – 24 (6.1%), one-box vehicles – 11 (2.8%); in 75 cases (18.9%), vehicle type and setup could not be installed.

The number of cases of collision of a car with a pedestrian amounted to 227 (57.18%) during the six-year period, fatal injury inside the car – 157 people (39.55%). With that, among cases of fatal injury inside the car, 77 people died were drivers (49,05%), passengers – 74 (47.13%); in 6 cases (3,82%), the location inside the car was not established. The victims with falling out of the car and being crossed by the wheel of the car accounted for 1 case per each (by 0,25%). Combined types of car injuries were rare, namely:

collisions of moving cars with a pedestrian and subsequent crossing by wheels were detected in 10 cases (2.52%), a person's falling out of a moving car with body crossing by the wheel – 1 case (0.25%).

The analysis of archival material showed that 185 dead (46.6%) were in an alcohol intoxication state at the time of a road accident. Notably, 36 victims (19.5%) of the total number of cases of a fatal car injury were in a state of light degree of intoxication, average degree – 53 (28.6%), high degree – 34 (18.4%), severe – 62 (33.5%). In 212 cases (53.4%), no ethyl alcohol was found in the blood of the dead.

373 people (93.9%) died from a concomitant injury. With that, the most frequent injuries were in the chest area – 319 cases (85.5% of the total number of concomitant injuries) and the head – 315 (84.5%). Slightly less often, lower limbs were injured – 222 cases (59.5%), upper limbs and the abdominal area – 184 per each (49.3%), the pelvis area – 133 (35.7%). Significantly less frequent in the complex of the concomitant injury, there were injuries to the neck – 20 cases (5.4%) and the lumbar region – 19 (5.1%). 24 people (6.1%) died from an isolated injury. In isolated injury, the head was more often damaged – 19 cases (79.2% of all isolated injuries), less often the neck area – 2 (8.3%), the chest, lower limbs, and abdomen – 3 cases (12.5%), 1 case per each area.

The frequency of occurrence of damage to the internal organs in fatal car injury was distributed as follows. In total, injuries to internal organs were reported in 97.7% (388 cases) of all fatal car injuries. The most frequent injuries were to the brain – in 73.7% (286 cases), the lungs – in 53.6% (208 cases), the liver – in 35.6% (138 cases), the spinal cord – 17.0% (66 cases), the heart – in 10.8% (42 cases), the spleen – in 17.5% (68 cases), the kidneys – in 8.5% (33 cases), the intestines – in 7.5% (29 cases), the diaphragm – in 3.4% (13 cases), the urinary bladder – in 2.8% (11 cases), the great vessels – in 16.2% (63 cases), the pancreas gland – in 0,5% (2 cases), the thymus gland, uterus, ovaries, adrenal gland, trachea – in 0,3% (1 case per each).

The most common cases in fatal car injury were fractures of the chest bone – 73.0% (290 cases) and skull – 54.9% (218 cases), followed by fractures of the lower limbs – 43.6% (173 cases), upper limbs – 35.5% (141 cases), pelvis – 33.2% (132 cases), spine (cervical and lumbar) – 13.9% (55 cases). In 152 out of 373 cases of concomitant injuries (40.8% of the total number of concomitant injuries) and in 6 out of 24 cases of isolated injuries (25.0% of the total isolated injuries), the injuries themselves were the main and immediate cause of death. A large proportion of all complications which were the immediate causes of death is occupied by abundant blood loss – 127 cases (53.14%); further, edema and swelling of the brain – 55 (23.01%), traumatic shock – 27 (11.30%), pneumonia – 13 (5.44%), sepsis – 7 (2.93%); pericardial sac tamponade, acute blood loss, purulent meningoencephalitis, fat embolism, pulmonary artery thromboembolia – 10 (4.18%).

Conclusions

1. Much more often, men of working age die from a car injury.
2. Almost in half of cases, the victims died in road accidents were in an alcohol intoxication state of varying degrees.
3. The main cause of death in road accident was a blunt concomitant injury.
4. The brain, lungs, and liver, as well as the bones of the chest and skull were most often damaged in a concominant and isolated injury.
5. The near and remote complications were most often the immediate cause of death in car injuries, slightly less often – the injuries themselves.

Conflict of interest. The authors declare no conflict of interest.

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DROWNING IN WATER: PROBLEMS OF DIAGNOSTICS; ANALYSIS OF EXAMINATIONS IN BARNAUL (2012-2017)

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The article describes a statistical analysis of death data when drowning in water. In the course of the study, the archive material of the morgue of Barnaul was used. The dynamics of mortality, the frequency of occurrence of characteristic morphological signs when drowning in water were determined.
Key words: *drowning, mechanical asphyxia.*

Currently, drowning is considered to be a type of violent death, occurring when a person is submerged in water and causing the development of acute pathological changes of vital organism systems. According to the manner of death, drowning is usually an accident. However, the aquatic environment can be a place to conceal traces of crime, which raises a number of basic questions in the study of corpses extracted from water, such as the determination of human entry into the reservoir while alive, mechanism of death occurrence, clarification of other causes that contributed to the development of drowning [1, 5, 6]. Thanatogenesis of death in cases of immersion of a human body in water has its own characteristics and allows to distinguish several types of drowning: aspiration (true), asphyctic (dry), syncopal, and mixed [2]. With that, true and dry drowning have their pathognomonic signs, and syncopal one is caused by simultaneous rapid reflex termination of respiratory and cardiac activity in sudden human exposure to extreme conditions [4]. In this regard, correct diagnosis and recording of morphological signs of different types of drowning are of great importance for the doctor forensic expert [3].

The work objective was to analyze the structure of mortality in drowning in water in Barnaul for 2012–2017.

Research tasks:

1. Examine expert conclusions in cases of drowning in water.
2. Get generalized indicators of death when drowning in water.
3. Establish the frequency of occurrence of characteristic morphological signs of drowning in water.

Materials and methods

We have studied the archival material of the thanatological department of KSBHI "Altai Regional Bureau of Forensic Medicine" for 2012–2017. In the study, we took into account the following: time of year, place of detection of corpses, sex, age, degree of alcohol intoxication of victims, frequency of occurrence of macro- and microscopic signs characteristic of this type of death both in the acts of forensic medical post-mortem examination and in the visit records of duty experts.

Results and discussion

After studying the archival material, it became clear that a total of 16165 examinations of corpses were carried out during the study period. Of these, the violent death constituted 42.3% (4388). It was established that as a result of drowning 84 persons died making 8.5% (979 cases) of total mechanical asphyxia and 2% (4388 cases) of violent death. Of the total number of drowned, 68 (82%) were men, 16 (18%) were women. In terms of age, there is a high mortality rate among persons of working age, i.e. young age (18–44 years) – 48 people, accounting for 57% of the total number of deaths. The largest number of drowning occurred in the summer period – 65 (77.3%), less often in spring – 9 people (10.7%), autumn – 7 (8.3%), and the lowest number of deaths from drowning occurred in winter – 3 (3.7%). The peak of drowning mortality was in July – 39.3% (33 cases), followed by a gradual decrease: August – 17.8% (21), September and October – 3.5% (3), November – 2.4% (2). The steady increase in mortality began with the beginning of the autumn period: September – 3.8% (5 cases), October – 8.5% (11), November – 10% (13). In December, the rate was 14.6% (19 cases). According to the days of the week, the studied material was distributed as follows: Saturdays – 16 people (19%), Sundays, Mondays and Wednesdays – 14 (16.6%), Tuesdays – 10 (11.9%), Thursdays and Fridays – 8 (9.5%).

Analysis of the places where corpses were found showed that 37 people were transported from the river (44%), from the lake – 24 (28.5%), from artificial reservoirs – 9 (10.7%), were found in the bath – 5 (6%), in the swimming pool – 2 (2.4%), delivered from other places (car, cesspool, in-patient hospital) – 4 (4.7%). In 3 cases (3.5%), the

location of detection was not indicated. In 71 cases (84.5%), the forensic expert on duty went to the location of the corpse. In accordance with Order N 346n of 12.05.2010 "On approval of the procedure for the organization and production of forensic medical examinations in state forensic institutions of the Russian Federation", the forensic medical expert must note a certain list of external signs when going to the location of detection of the corpse. The analysis showed that the following was recorded: the severity of signs of maceration – in 4 cases (4.7%), the absence or presence of cuticle, nails, the degree of stability of hair on the head or their absence are specified never once, the presence and color of foam at the mouth and nose holes – in 35 cases (41.6%), the presence and localization of mechanical damages are indicated in 30 cases (35.7%). In 4 cases (4.7%), damages not specified in the visit record of the duty expert were found during the examination in the morgue.

In external examination, small-bubble foam from mouth and nose holes occurs in 37 (44%) cases, face cyanosis and hemorrhages in the palpebral conjunctiva occur in 20 (23.8%) and 14 (16.6%) cases respectively. In internal examination, the presence of the following signs was most often revealed: light red hemorrhages with unclear borders over the pulmonary pleura (Rasskazov-Lukomsky-Paltauf spots) – 82 (97.6%), acute emphysema of lungs – 79 (94%), fluids in the sphenoid bone sinus (Sveshnikov's sign) – 76 (90.4%), less often the Fagerlund's sign – 26 (31%) and the spasm of the fissure of glottis – 15 (17.8%). In histological study, hyperextension and rupture of the walls of alveoli were most often observed – 60 (71.4%), less often capillaries congestion – 55 (65.4%) and foci of atelectasis – 16 (18.7%). From the above, it can be noted that the aspiration type of drowning occurred in 16 (19%) cases, the asphyctic one in 25 (29.7%) cases, and 43 (51.4%) cases of drowning can be classified as mixed.

Sample at the sectional table for the presence of sand in the lungs (sample for "sand creak") was carried out only in 26 cases (34.6%), of which the result was positive in 16 cases (21%). It should be noted that the study for diatom plankton in the Altai Regional Bureau of Forensic Medicine is not carried out due to the frequent receiving of false positive results.

In addition to the specific signs of drowning, there are also general asphyctic, such as: spilled livor mortis, liquid dark blood, congestion of internal organs were noted in all 84 cases (100%), hemorrhage under pulmonary pleura and epicardium (Tardieu's spots) in 60 cases (71.4%). Only one of the signs of the corpse's stay in water is described – maceration of the skin of feet and palms in 15 people (18%).

External examination of the corpse revealed injuries in the form of abrasions and bruises of various localizations, formed shortly before death and not related to drowning, they were noted in 28 people (33.3%); wounds resulting from exposure to sharp objects were found in 3 cases (3.5%).

According to forensic chemical studies, 65 victims (79.7%) revealed the presence of ethyl alcohol in the blood. With that, the maximum ethanol concentration in the blood amounted to 5.1 ppm, the minimum – 0.3 ppm. Out of 65 people drowned, alcohol concentration corresponded to the light degree of alcohol intoxication in 6 people (9.23%), average degree – in 25 (38.4%), high degree – in 16 (24.6%), severe – in 18 people (27.6%).

Morphological signs of concomitant diseases that did not affect the cause of death were identified in 43 cases (51.2%). In 38 observations (88.3%), these are manifestations of atherosclerosis of aorta and coronary arteries in various stages; in 3 (6.9%) – lung diseases; in 2 (4.6%) – other pathology.

Conclusions

1. In the study of corpses of people who died from drowning, forensic experts record morphological signs specific to the true and asphyctic type of drowning; at the same time, there were no cases of syncopal drowning in the archive of the thanatological department of KSBHI "Altai Regional Bureau of Forensic Medicine" for the chosen period.

2. Rate of mortality from drowning in the structure of violent death in Barnaul is low, as a rule, it falls on the summer period, mainly in rivers and lakes, which can be associated with the beginning of the "swimming season".

3. Most often, male, young, working age people die from drowning, and more than half of the dead were found to have ethyl alcohol in the blood.

4. At the place of detection of the corpse, the duty expert does not always record a complete list of external signs inherent in death from drowning and also not always determine supravital reactions, the intrahepatic (rectal) temperature and ambient temperature are rarely fixed, though they allow determining the prescription of death coming in the most informative way.

Conflict of interest. The authors declare no conflict of interest.

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GESTATIONAL DIABETES MELLITUS: PATHOGENESIS OF INFLUENCE ON MOTHER AND FETUS

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Gestational diabetes mellitus (GDM) is *a pathology that occurs in a significant number of women during pregnancy, usually develops in the third trimester (between 24 and 28 weeks) and usually disappears after the birth of the child. This disease can affect both the health of the mother and the health of the fetus. The GDM is a topical and discussed problem from the medical and social point of view. Also, GDM significantly increases the frequency of adverse outcomes for both the mother and the fetus.*
Key words: *gestational diabetes mellitus, population, morbidity.*

The relevance of the GDM problem is that its prevalence is steadily increasing worldwide. Thus, the frequency of GDM in the total population of different countries varies from 1 to 14%, averaging 7%. In addition, GDM is considered a precursor and marker of type II diabetes mellitus. Numerous studies have shown that 15 years after childbirth, the prevalence of type II DM in women with GDM and obesity in history will amount to 60%.

According to the State Register of Diabetes Mellitus, the prevalence of GDM in our country constitutes 8-9%.

Pregnancy is a physiological stress for beta cells of the pancreas gland, which appears as a "diabetogenic factor" to the body. As the placenta matures, insulin resistance, which is the main cause of the development of GDM, gradually increases. This process involves fetoplacental hormones (placental lactogen and progesterone) and mother hormones (cortisol, estrogens, prolactin), the blood concentration of which also increases with the increase in terms of pregnancy. There is compensation through the increase in production and decrease in clearance of endogenous insulin of the mother. Insulin resistance increases with increased caloric content of the mother's food, decreased physical activity, and weight gain. The presence of insulin resistance and insufficient insulin secretion lead to an increase in concentration of glucose, free fatty acids (FFA), some amino acids, and ketones in blood plasma. If there are risk factors such as: violation of glucose tolerance or impaired glycemia on an empty stomach, family history identifying a relative with type 2 diabetes mellitus, maternal age – risk factor in a woman increases with age (especially in women over 35 years), insulin secretion becomes insufficient to overcome insulin resistance, which leads to hyperglycemia.

Hyperglycemia in the mother also complicates the course of pregnancy and childbirth, which leads to multiple damage to the organs of the developing fetus – diabetic fetopathy, in which there are disorders from the pancreas gland, kidneys, circulatory system of the child. Besides, the increase in blood glucose level leads to significant disorders of the newborn's adaptation in the early postnatal period. Preeclampsia is the potential complication that occurs during pregnancy with GDM. This condition is accompanied by the appearance of protein in the urine, high blood pressure, and fluid retention in the body. An important indicator of pathology is albuminuria (presence of protein in the urine). In parallel, there is a violation of blood clotting and a decrease in the activity of liver enzymes.

The development of complications of pregnancy and the incidence of newborns reach almost 81% in GDM. Up to 50% of cases are at risk of termination of pregnancy and premature birth.

Conflict of interest. The authors declare no conflict of interest.

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MORPHOMETRIC ANALYSIS OF NUCLEOLAR ORGANIZERS OF WISTAR RAT HEPATOCYTES IN SINGLE DEEP IMMERSION HYPOTHERMIA

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The article describes the results of the analysis of rat nucleolar organizers in aqueous hypothermia. In the course of the work, the morphofunctional activity of the nucleolar apparatus depending on the duration of hypothermia was studied. Adaptive processes of the nucleolar apparatus in the posthypothermic period were determined.
Key words: *hypothermia, rats, liver, nucleus.*

The nucleolus is the most dynamic organelle of the cell, and its structure reflects the levels of three main processes associated with ribosome biogenesis: synthesis of preribosomal ribonucleic acid, processing and migration of ribonucleoprotein particles in nucleoplasm. One of the remarkable properties of the nucleoli is their high plasticity, which is manifested in changes in size, morphology, and localization in the nucleus when responding to numerous external stressful impact, as well as in adapting to adverse factors. We have not found investigations of nucleolar organizers in liver cells by silvering method under the influence of hypothermia in literature.

Objective: to carry out a morphometric analysis of nucleolar organizers of Wistar rat hepatocytes in single deep immersion hypothermia.

Materials and methods

The study was conducted on 20 white Wistar rats. Hypothermia was modeled by placing animals in water with a temperature of 5°C at an ambient temperature of 7°C. The criterion for the experiment termination was the achievement of rectal temperature of 20–25°C, which corresponded to deep hypothermia. The exposure time was 40±5 min. During the experiment, the animals were divided into 4 groups: group 1 (n=5) – animals were euthanized by decapitation immediately after cooling cessation; group 2 (n=5) – after 2 days; group 3 (n=5) – after 7 days, and group 4 (n=5) – after 14 days. Nucleolar organizers were revealed according to the two-stage method of Daskal Y. et al. in our modification. With the zoom x1000 under the oil immersion of the microscope, the number of nucleoli, the total area of argyrophilic granules (AgNORs) per 1 nucleus, the area of one nucleolar organizer, and nucleolus-nucleus ratio (Ncll/ncl) in relative units (RU) were calculated. Morphometric measurements were carried out using VideoTest-Morphology 5.2, a digital camera adapted to a light microscope, and a personal computer. Statistical processing of the material was carried out with the use of the Statistica 10.0 statistical package.

Results

When coloring liver histological preparations of experimental animals, the nucleolar organizers were clearly identified in the form of black granules (AgNORs) on the yellowish background of nucleus nucleoplasm.

Immediately after hypothermia, the average number of AgNORs in hepatocytes amounted to 1.2±0.1 per 1 nucleus. The average total area of AgNORs was 2.7±0.2 μm² per 1 nucleus. The average area of 1 AgNORs was 2.1±0.1 μm². The Ncll/ncl ratio was 0.11±0.01 RU.

After 2 days, the average number of AgNORs amounted to 2.35±0.1 per 1 nucleus. The average total area of AgNORs was 5.6±0.2 μm² per 1 nucleus. The average area of 1 AgNORs was 2.2±0.1 μm². The Ncll/ncl ratio was 0.15±0.004 RU.

After 7 days, the average number of AgNORs amounted to 3.4±0.1 per 1 nucleus. The average total area of AgNORs was 8.7±0.2 μm² per 1 nucleus. The average area of 1 AgNORs was 2.6±0.1 μm². The Ncll/ncl ratio was 0.16±0.004 RU.

After 14 days, the average number of AgNORs amounted to 2.0±0.1 per 1 nucleus. The average total area of AgNORs was 4.2±0.2 μm² per 1 nucleus. The average area of 1 AgNORs was 2.1±0.1 μm². The Ncll/ncl ratio was 0.11±0.004 RU.

Conclusion

Thus, the nucleolar apparatus of rat liver cells was damaged during cold exposure, but in the posthypothermic period there were active adaptive compensatory processes characterized by nucleolus hypertrophy and amplification, which led to normalization of ribosomal synthesis and regeneration of hepatocytes.

Conflict of interest. The authors declare no conflict of interest.

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STUDY OF MORPHOMETRIC PARAMETERS OF RENAL CELL CARCINOMA

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The paper describes the problem of renal cell carcinoma and the possibility of expanding the diagnostic potential by studying the morphometric parameters of cell nuclei.
Key words: *renal cell carcinoma, morphometric parameters, diagnosis.*

The number of patients with RCC is constantly growing, which served as the basis for a more thorough study of the disease etiology, pathogenesis, and also became a trigger of search for new ways of diagnosis and treatment of this nosological unit. The heterogeneity of the characteristics of tumor cells is quite variable and the study of morphometric parameters of cell nuclei obtained from the material of patients with RCC can be an excellent help in the study of this phenomenon. Determination of phenotypic features of cells can also help to develop a more objective tumor gradation in RC, as well as to objectify the disease prognosis. Today, renal cancer is quite common among the population and in the statistics of urological tumors it is in the third position after malignant formations of the prostate gland and the urinary bladder. However, it is worth noting that renal cancer is the leader in mortality. Of the total, renal cell carcinoma accounts for about 3% of all malignant formations in the adult population. The individual risk of the disease is closely associated with both the characteristics and the risk factors of a certain person and is about 0.8–1.4%; each year, the occurrence of renal cell carcinoma increases by 2.5%.

The aim was to study the morphometric characteristics of renal cell carcinoma cell nuclei depending on sex, age, and clinical and morphological parameters of the tumor to identify significant criteria of differential diagnosis of this disease.

Materials and methods

Materials from 115 patients with renal cell carcinoma from the KSBHI "Altai Regional Oncology Dispensary", Barnaul were examined for this work.

The following method was used for histological processing of the obtained material: the operating material was labeled, fixed in 10% solution of neutral formalin for 24 hours. Then alcoholic dehydration was carried out with the subsequent embedding in paraffin. The materials were stained with haematoxylin and eosin.

Morphometry was performed using the program VideoTest-Morphology 5.2 with the "parameter distribution" method in automatic mode. In the morphometric study of the nucleus, we determined its area (μm2), perimeter, average, minimum and maximum diameters (μm), as well as derivatives – the nucleus circle factor (RU) characterizing the proximity of the object form to the circle (the circle = 1); the nucleus ellipse factor (RU) characterizing the proximity of the object to the ellipse (the ellipse = 1); the nucleus elongation factor (RU) – the ratio of the nucleus overall length to the nucleus overall width.

Results and discussion

Morphometric parameters of cell nuclei of renal cell carcinoma and unaltered kidney tissue.

Average values of most morphometric parameters of tumor cell nuclei were significantly higher (area: 33.3±0.4 μm^2, perimeter: 20.9±0.1 μm, diameter: 6.6±0.04 μm, the elongation factor: 1.25±0.004 RU) than in the unaltered tissue (area: 13.1±0.3 μm^2, perimeter: 13.2±0.2 μm, diameter: 4.7±0.05 μm, the elongation factor: 1.21±0.04 RU), except for the indicators of the circle factor and the ellipse factor (in the case of RCC – the circle factor: 0.924±0.002 RU, the ellipse factor: 0.996±0.003 RU. With unaltered kidney tissue – the circle factor: 0.954±0.006 RU, the ellipse factor: 0.996±0.0004 RU).

Morphometric parameters of RCC cell nuclei depending on the sex of patients.

Most morphometric parameters in men were significantly higher than in women, except for the circle factor (in men – area: 35.8±0.8 μm^2, perimeter: 21.56±0.3 μm, diameter: 6.8±0.2 μm, the circle factor: 0.927±0.001 RU, the ellipse factor: 0.996±0.0001 RU, the elongation factor: 1.29±0.01 RU. In women – area: 30.6±0.5 μm^2, perimeter: 20.5±0.2 μm, diameter: 6.6±0.1 μm, the circle factor: 0.937±0.001 RU, the ellipse factor: 0.99±0.0001 RU, the elongation factor: 1.25±0.01 RU).

Morphometric parameters of RCC cell nuclei depending on the age of patients.

Most morphometric parameters of tumor cell nuclei in RCC increased with age. Thus, the smallest values of area (25.7±0.7 μm²), perimeter (17.8±0.3 μm), diameter (5.7±0.1 μm), the ellipse factor (0.945±0.0004 RU) and the elongation factor of nuclei (1.20±0.02 RU) are marked in the range of 30–39 years; the highest values of area (36.5±0.7 μm²), perimeter (20.5±0.2 μm) and diameter of nucleus (6.8±0.1 μm) – in patients aged 50–59 years; and the highest values of the nucleus elongation factor (1.29±0.01 RU) in the patients aged 60–69 years. The highest values of the ellipse factor (0.996±0.0001 RU) were noted in the range of 70–79 years. The exception is the circle factor, the highest values of which were observed at the age of 30–39 years (0.945±0.005 RU), and the lowest values were observed in 60–69 years (0.923±0.002 RU).

Morphometric parameters of tumor cell nuclei depending on the histological variant of RCC.

In comparison with other histological variants, significantly higher indicators of area (63.8±2.0 μm²), perimeter (32.1±0.7 μm), diameter (9.7±0.2 μm) and the nucleus elongation factor (1.53±0.04 RU) were registered in spindle cell cancer. The minimum values of area (28.5±1.0 μm²), perimeter (18.4±0.3 μm) and nucleus diameter (5.7±0.1 μm) were observed in papillary cancer. The smallest elongation factor (1.21±0.02 RU), as well as the maximum circle factor (0.942±0.005 RU) were noted in neuroendocrine cancer.

Morphometric parameters of RCC tumor cell nuclei depending on the size of the tumor node.

The increase in tumor size was accompanied by a significant increase in average values of area (<7.0 cm: 25.4±0.4 μm², ≥7.0 cm: 46.3±0.6 μm²), perimeter (<7.0 cm: 18.5±0.15 μm, ≥7.0 cm: 24.6±0.2 μm), diameter (<7.0 cm: 5.7±0.04 μm, ≥7.0 cm: 7.9±0.05 μm) and the elongation factor of the tumor cell nucleus (<7.0 cm: 1.26±0.0005 RU, ≥7.0 cm: 1.29±0.01 RU); at the same time, there was a decrease in the values of the circle factor (<7.0 cm: 0.935±0.001 RU, ≥7.0 cm: 0.923±0.001 RU) and the ellipse factor (<7.0 cm: 0.995±0.0001 RU, ≥7.0 cm: (0.989±0.001 RU), i.e. the nuclei of large tumor cells became larger, elongated and less rounded.

Morphometric parameters of RCC tumor cell nuclei depending on the presence of regional and remote metastases.

In metastazing tumors, we revealed the highest average values of area (54.6±0.9 μm², in tumors without metastases: 28.9±0.4 μm²), perimeter (27.9±0.3 μm, in tumors without metastases: 19.3±0.1 μm), diameter (8.8±0.1 μm, in tumors without metastases: 6.1±0.03 μm), the ellipse factor (0.995±0.0003 RU, in tumors without metastases: 0.997±0.0006 RU), the elongation factor of the tumor cell nucleus (1.41±0.001 RU, in tumors without metastases: 1.26±0.004 RU) and at the same time the lowest value of the circle factor (0.906±0.003 RU, in tumors without metastases: 0.935±0.001 RU).

Conclusion

As a result of the work, we see that morphometric parameters of renal cell carcinoma cell nuclei directly depend on such indicators as: sex, age, histological variant of the tumor, size of the tumor node, and presence of metastases. These indicators can be used in the future to improve the identification of significant criteria for differential diagnosis of this disease.

Conflict of interest. The authors declare no conflict of interest.

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COMPARATIVE STUDY OF THE PREVALENCE OF MESENCHYMAL DYSPLASIA AMONG SPORTSPERSONS

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The article describes the results of the study of the presence of connective tissue dysplasia among sportspersons, as well as data to determine the relationship between individual achievements in sports and presence of connective tissue dysplasia in sportspersons. In the course of the study, 292 students from universities in Altai Krai were surveyed using a questionnaire.

***Key words**: dysplasia, sportspersons, signs, dependence.*

Nowadays, connective tissue dysplasia is a very common pathology, but not everyone knows about its existence.

Connective tissue dysplasia, though being pathology (violation of fibrillogenesis, osteogenesis, leading to morphofunctional disorders of visceral and locomotor organs), in many life spheres would be useful; thus, for example, the presence of manifestations such as long thin fingers would be useful to musicians playing the piano, who could easily take on the "Rachmaninoff symphony of 6 fingers"; or joints hypermobility syndrome would be useful for girls who decided to devote themselves to gymnastics, dance; and asthenic type of body constitution can play an important role in the career of a volleyball or basketball player.

Knowing all this, parents whose children have such a pathology could initially correctly distribute opportunities and correlate them with the interests of their child. It would not only help form of a mature and conscious personality, but would also work for the benefit of the country, as there would be a lot of sportspersons able to brilliantly represent the country at various world competitions.

The aim of the work was to determine the presence and prevalence of connective tissue dysplasia in professional sportspersons and amateur sportspersons. It was necessary to conduct a study that would help prove that sportspersons who have this pathology achieve higher results than those without it.

Research tasks:

1. Select the objects of study and the method of collecting information.
2. Determine which specific features should be identified in the survey participants.
3. Systematize and analyze the received information; provide the data of analysis in the form of diagrams and calculations.

Materials and methods

The object of the study is young people:

1. Students of the Institute of Physical Culture and Sports of AltSPU (current year of study). In total, 105 people are surveyed.
2. Students of I.I. Polzunov AltSTU and students of ASMU. In total, 187 people are surveyed.

Furthermore, all respondents can be divided into three groups:

1. Those who are engaged in sports that are more likely to involve aerobic load and flexibility (e.g.: swimming, gymnastics, running (steeplechase, sprinting, long-distance running), jumping (long and high), basketball, biathlon, etc.)
2. Those who are engaged in sports that are more likely to involve anaerobic load and significant muscle development (arm-wrestling, wrestling, boxing, powerlifting, etc.)
3. A group in which all sports are united.

This distribution will help thoroughly examine each group in turn, and in the third – to compare and to pay attention to the prevalence.

Before creating a questionnaire, it is important to determine the signs that we hope to identify in the respondents. These are:

1. The presence of anemic and hemorrhagic syndromes.
2. Possibility of bringing the thumb to the wrist (on both hands).
3. Possibility of overbending in the elbow joint.
4. Possibility of overbending in the knee joint.
5. Longitudinal flat feet.
6. The ratio of outspread arms to body length is greater than 1.03.
7. Myopia.
8. Arachnodactylia.

After that, a questionnaire survey of students was conducted. All questionnaires were then in person processed and analyzed.

Results and discussion

Analysis data of the group of students of the Institute of Physical Culture and Sports of AltSPU are as follows:

There were revealed 54% of students-sportspersons with CTD.

4 girls had 5 or more signs of CTD. 21 boys out of 41 had 5 or more signs of CTD. In total, 25 people showed signs of CTD.

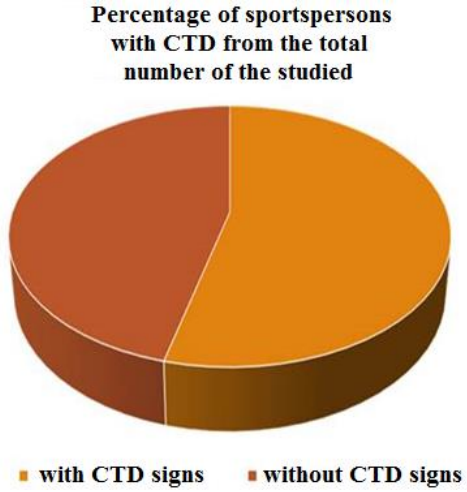

Figure 1. Percentage of sportspersons with CTD from the total number of the studied.

46 – 100%
25 – x%
X=25*100/46
X=54%

The total number of signs (among girls and boys) is **239**.

239 – 100%
31 – x%
X=31*100/239
X=13% **– anemic syndrome**
239 – 100%
34 – x%
X=34*100/239
X=14% **– hemorrhagic syndrome**

Types of sports and the number of people participating with the signs of CTD:

1. Skiing – 9 people (5 of them with CTD; without CTD – three are first-class, one – Master of Sports, Candidate Master of Sports; with CTD – three are CMS, one – first-class).
2. Basketball – 3 people (0 with CTD; two are first-class).
3. Volleyball – 2 people (both with CTD; CMS and first-class).
4. Swimming – 2 people (both with CTD; second-class and CMS).
5. Football – 5 people (4 of them with CTD; two are second-class).
6. Gymnastics – 8 people (2 of them with CTD; with CTD – two are first-class; without CTD – four are second-class, one – third-class).

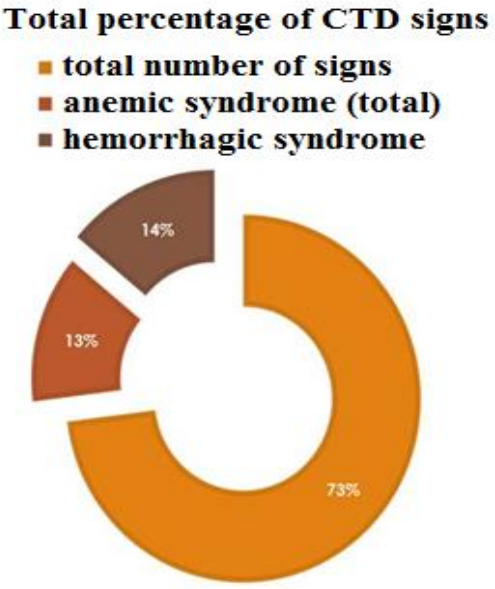

Figure 2. Total percentage of CTD signs.

7. Hockey – 4 people (3 of them with CTD; with CTD – third-class, first-class; without CTD – first-class).
8. Athletics – 4 people (4 of them with CTD; MS, three are first-class).
9. Other sports – 11 people (4 of them with CTD; two are MS, one – CMS).

During the analysis of the work, it was revealed that the presence of any achievements in the individual sport does not depend on the presence of connective tissue dysplasia.

Data from the group of students of AltSTU and ASMU are the following:

The types of sports that these students are engaged in include: wrestling, kettlebells, arm-wrestling, powerlifting, boxing. All respondents had more than 3 signs of dysplasia, which is rare compared to the previous group, in which there are mainly skiing, swimming, football, gymnastics.

Findings: low frequency of detection of connective tissue dysplasia can be associated with the principles of sports selection, as more endurance sportspersons with a high level of physical development are selected for training and competitive activity in more physically severe types of sports.

The third group included respondents with various preferences in sports.

94 participants (32 girls and 62 boys) aged 18–28 years engaged in basketball, football, athletics, swimming, wrestling, dancing, arm-wrestling were interviewed.

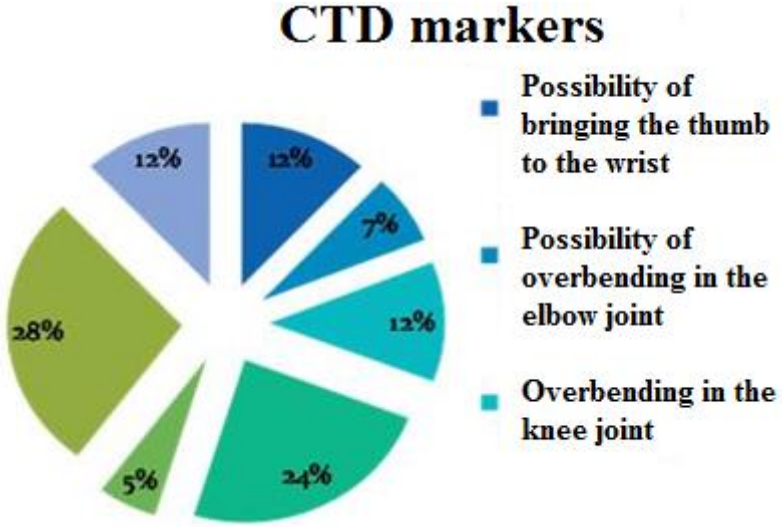

Figure 3. CTD markers detected in respondents engaged in kettlebell lifting.

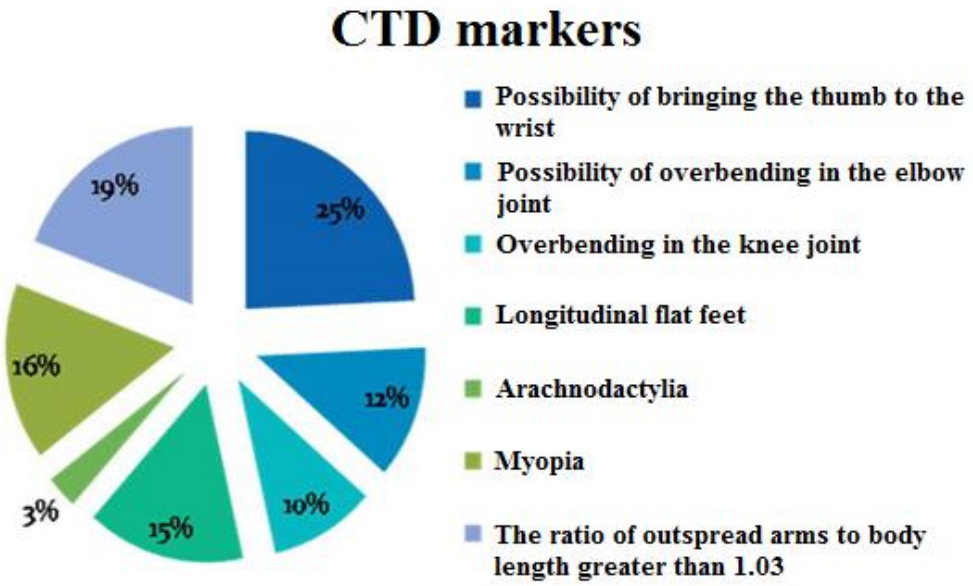

Figure 4. CTD markers detected in respondents engaged in wrestling and judo.

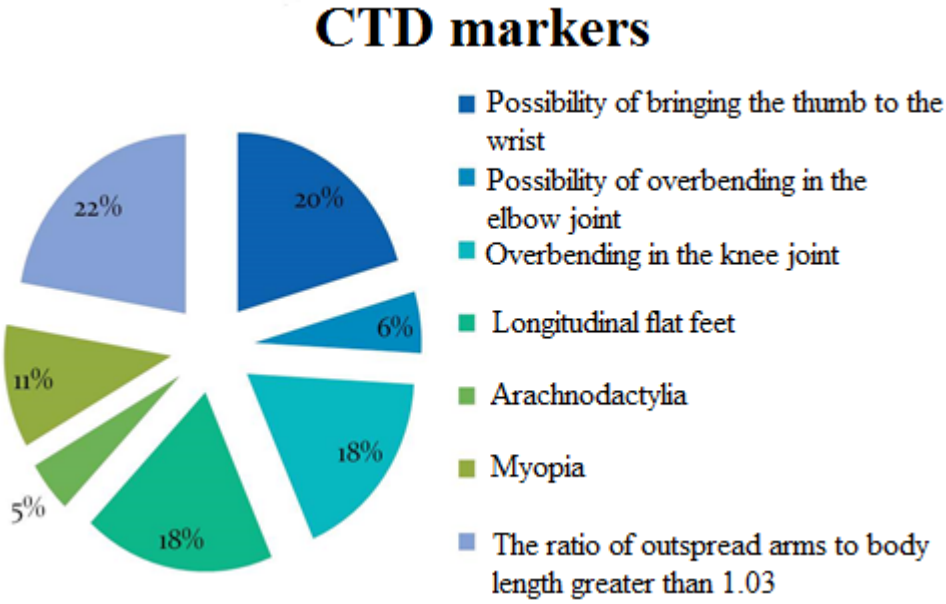

Figure 5. CTD markers detected in respondents engaged in arm-wrestling.

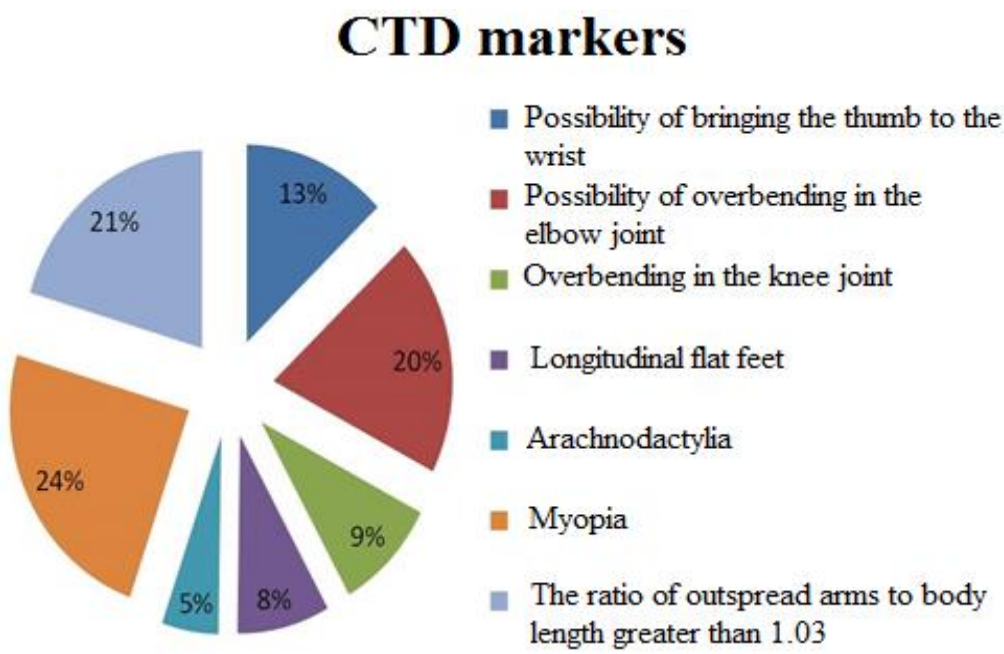

Figure 6. CTD markers.

In addition, studies of dependence of locomotor disorders in sportspersons with CTD in comparison with sportspersons without this feature were carried out:

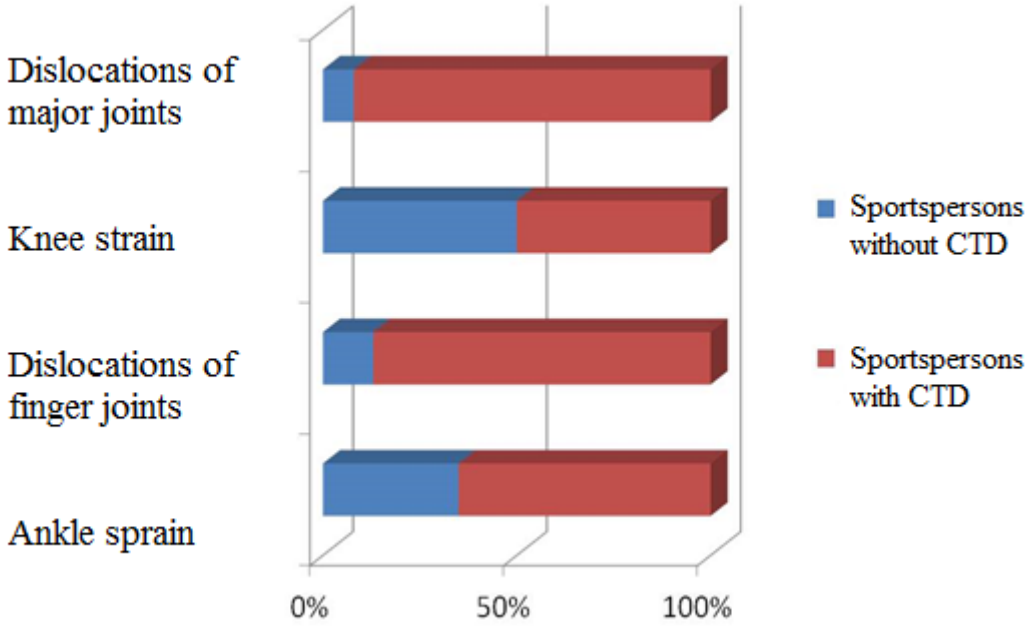

Figure 7. Intrabar chart comparing the frequency of injuries in sportspersons with and without CTD.

Conclusions

1. Success in certain sports largely depends on the presence of connective tissue dysplasia in sportspersons.
2. The presence of connective tissue dysplasia will not give an advantage in receiving any reward or class.
3. Sportspersons with CTD are at least twice more likely to encounter injuries of the musculoskeletal system than those without it.
4. Besides, weak ligamentous apparatus accelerates the occurrence of pathologies, which form for years in sportspersons without CTD (flat feet of football players, ballet dancers).
5. Rehabilitation of sportspersons with CTD after injury takes much longer than in sportspersons without it.

Conflict of interest. The authors declare no conflict of interest.

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SPREAD OF SKIN PIGMENTATION IN SURVEYED WITH MESENCHYMAL SIGNS

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The article describes the results of the study of the relationship between skin pigmentation and phenotypic signs of connective tissue dysplasia. The study revealed a violation of pigment exchange in students with signs of mesenchymal dysplasia.
Key words: *pigmentation, moles, mesenchymal dysplasia, pigment exchange.*

Connective tissue dysplasia is a group of clinically polymorphic pathological conditions caused by hereditary or congenital defects in collagen synthesis and accompanied by a violation of functioning of the internal organs and the locomotor system.

The aim of the work was to establish the possible relationship between pigment metabolism and the presence of phenotypic signs of undifferentiated connective tissue dysplasia.

Research tasks:

1. Preliminary division of the examined into groups with and without signs of mesenchymal dysplasia.
2. Identification of the quantity, size, and color of skin pigmentation in both groups.
3. Determination of the relationship between pigment metabolism and the presence of signs of mesenchymal dysplasia.

Materials and methods

In the course of the study, 80 people in the age group from 18 to 22 years were interviewed.

The survey included a questionnaire as well as physical examination. Information was collected and analyzed on the number, size and color of moles, as well as their localization, the diameter of the largest moles, the presence of other pigmentation, and the hereditary factor.

Results and discussion

In the study of signs of joint hypermobility, samples were carried out according to the Beighton score. The objective of the test was whether the surveyed could perform these samples and whether they could on both sides. For each sample, 1 point was awarded. If there are more than 5 points, it is possible to indicate the presence of joint hypermobility, that is, phenotypic signs of mesenchymal dysplasia are revealed.

Thus, 24.2% of respondents were capable of wiggling their ears. Particular flexibility was characteristic of 23.2%. Free adduction of the thumb to the forearm was revealed in 23.2%. Hyperelastic skin (the fold in the clavicle area is freely pulled by two fingers by 1 cm, 2 cm) was observed in 15.2%.

There were no signs in 48.5%.

The hereditary factor was also taken into account. The issue of special skills corresponding to hypermobility was considered. Thus, it was revealed: father had hypermobility – 22.2%, mother – 15.2%, brothers – 11.1%, sisters – 12.1%, no one did – 59.6%.

The retaining of youthfulness that does not correspond to the passport age was studied. The results were as follows: mother retains youthfulness – 18.2%, father – 9.1%, both – 28.3%, nobody – 44.4%.

The phenomenon of splanchnoptosis was studied as well. The result were the following: father – 1%, mother – 5.1%, brothers – 1%, sisters – 5.1%, there was no such phenomenon – 89.9%. Thus, the female sex is more susceptible to the phenomenon of splanchnoptosis.

From the data of Table 1, it is possible to establish the relationship between pigment metabolism and the presence of phenotypic signs of connective tissue dysplasia.

The number of moles in the examined with signs of mesenchymal dysplasia is 2.9 times higher than in students without signs. Besides, the presence of black moles is higher by 21%. In turn, black moles are a precancerous state of melanoma. The size of moles is larger. This group has a higher percentage of moles that change color and grow. There is more various pigmentation by 7%, including birthmarks. Predominate localization of pigmentation is on the right hand in both groups.

These results indicate a violation of pigment metabolism in a group of people with phenotypic signs of undifferentiated connective tissue dysplasia.

In total, the number of examined with phenotypic signs of connective tissue dysplasia was 30 people, 37.5% respectively. Without phenotypic signs, there were 50 people, which amounted to 62.5%.

Table 1

Questionnaire and physical examination data

	With signs of mesenchymal dysplasia	Without signs of mesenchymal dysplasia
1. The number of moles	3 to 156 Average: 58	1 to 93 Average: 20
2. The color of moles	Brown: 73% Black: 27%	Brown: 92% Black: 6%
3. The size of moles	Small: 60% Average: 33% Large: 7%	Small: 82% Average: 14% Large: 4%
4. The diameter of the largest	0.1 to 1 cm Average: 0.4 cm	0.1 to 4.5 cm Average: 0.4
5. Localization	Mostly right hand	Mostly right hand
6. Troubles or not	No	No
7. Grows or not	Grows in: 7%	Grows in: 4%
8. Changes color	Changes color in: 3%	Changes color in: 2%
9. There is other pigmentation	Various pigmentation in: 27%	Various pigmentation in: 20%
10. Inheritance	Inherited in: 50%	Inherited in: 32%

Conclusion

According to the results of the study, in people with pronounced signs of undifferentiated connective tissue dysplasia, skin pigmentation is more pronounced, and large moles are also more common. The occurrence of black moles is higher, they are a sign of melanoma. Moreover, there are a large percentage of moles growth and change of color and expressed inheritance of pigmentation.

Thus, in those surveyed with signs of undifferentiated connective tissue dysplasia, pigment metabolism is violated.

Conflict of interest. The authors declare no conflict of interest.

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THE ROLE OF IODINE DEFICIENCY IN THE PATHOGENESIS OF THYROID DISEASES

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The problem of iodine deficiency diseases (IDD) in terms of level and scale is relevant in many countries of the world, including Russia. The lack of iodine in the diet of the population leads to a number of diseases, a significant proportion of which is the pathology of the thyroid gland, as it is an obligatory structural component of the thyroid hormones that ensure the full development and functioning of the human body.
Key words: *iodine, iodine deficiency, thyroid gland, iodine deficiency diseases, iodine prevention.*

The problem of iodine deficiency diseases (IDD) in terms of level and scale is relevant in many countries of the world, including Russia. According to the World Health Organization (WHO), one third of the world's population is living in iodine deficiency due to insufficient levels of iodine in the environment (remoteness from the sea, mountain terrain, aged soils), food products [1, 2, 9]. IDD are also caused by iatrogenesis and gene mutation, which leads to a violation of iodine intake into the thyroid gland. The lack of iodine in the diet of the population leads to a number of diseases, a significant proportion of which is the pathology of the thyroid gland, as it is an obligatory structural component of the thyroid hormones that ensure the full development and functioning of the human body.

For the production of a sufficient amount of thyroid hormones, exogenous iodine is necessary in sufficient quantity in the body. The daily need of iodine averages 90–250 μg/day [7]. At the same time, 10–20 μg of the trace element are lost daily with faeces in the form of glucuronides and another 100–150 μg with urine. The thyroid gland needs 60–75 μg of iodine per day. In the blood plasma, iodine resides in the form of iodide anion which is freely filtered in the renal glomeruli, but then 60–70% of the anion is readsorbed in the tubules of nephrons, entering back into the blood and intercellular space.

Since the iodide concentration in blood plasma is low, the process of biochemical reactions is started to accumulate sufficient amounts of trace element in thyreocytes. The essence is that the transport protein Na+,I- -KT expresses on the membrane of thyreocytes, by which two anions Na and one anion I are simultaneously transferred inside the cell (transfer against electrochemical gradient). Thyroglobulin (TG) is synthesized for further implementation. In the presence of thyroid peroxidase (TPO), H2O2 oxidizes iodide and promotes its adhesion to thyrosine residues of TG, forming monoiodotyrosine (MIT) and diiodotyrosine (DIT). TPO also catalyzes the binding of two or one DIT molecule(s) and one MIT molecule to each other, resulting in T4 or T3 products respectively. These hormones remain as a part of TG and enter the colloid, where they are stored. If necessary, a part of the colloid is captured by thyreocytes through pinocytosis, resulting in phagolysosome formation. Under the action of specific proteases, TG that have got into these phagolysosomes lyses; T4, T3, MIT, and DIT are released from its composition and are transferred to the base membrane of the thyrocyte within the phagolysosome residue. Here, T4 and T3 are released into the capillaries surrounding the follicle, and MIT and DIT are deodized (with iodine tyrosine halogenase). The resulting tyrosine and iodine are reused for synthesis and iodization of TG. All the above stages are stimulated by TSH, which is secreted in the pituitary gland [5].

There is also an inverse relationship between the amount of organic iodine compounds in the gland tissues and the production rate of thyroid hormones. Self-regulation of the gland activity allows to keep the production rate of these hormones at a relatively constant level regardless of fluctuations in iodine intake. Inside the gland itself, self-regulation is aimed at maintaining this pool at a constant level; this stability is achieved as the gland tissues usually have a significant supply of ready-made hormones used when disruption of their synthesis process occurs. The external regulation, the axis of hypothalamus – pituitary gland – thyroid gland, reacts to the availability of ready thyroid hormones on the periphery [5].

Biosynthesis of thyroid hormones is regulated by the thyroid-stimulating hormone of the pituitary gland by the mechanism of negative feedback in the thyroid gland. The higher the number of thyroid hormones in the blood, the less the pituitary gland produces thyroid-stimulating hormones, thereby reducing the thyroid gland activity to the synthesis of thyroid hormones. With iodine deficiency, the number of thyroid hormones

decreases, for which the pituitary gland meets the increase of thyroid-stimulating hormones to activate the thyroid gland and increase the synthesis of thyroid hormones. Therefore, the receptors catch a decrease in the T_4 concentration in the blood, but the activation of the TSH synthesis is caused by a decrease in T_3, after which the production of Na^+,I -KT, TG, and TPO activates under the action of TSH, the synthesis of iodized hormones accelerates.

Under the influence of prolonged stimulation with large doses of the thyroid-stimulating hormone, which increases the average functioning time of each carrier molecule in the membranes of thyreocytes and activates the process of embedding of synthesized *de novo* molecules Na\I'-KT into cell membranes, the thyroid gland grows, which increases its ability to capture the deficiency iodine from blood flow and production of thyroid hormones.

Thyroid hormones regulate metabolic processes in all cells of the body, so the disruption of their synthesis can lead to both dystrophy and obesity, and in children can cause physical and mental retardation. In severe cases, without treatment, the patient will suffer a painful death [1, 4, 5].

So, a defect of the gene coding Na^+,r-KT production is the first and main violation, severe hereditary hypothyroidism develops with pronounced thyroid hyperplasia (goiter). Its treatment requires the introduction of large amounts of inorganic iodine into the patient's body.

The second of the important ones is the violation of Na^+,I –KT integration into the membrane of thyreocytes due to the violation of pendrin protein. It is shown that pendrin is localized in apical membranes of thyreocytes and catalyzes both iodide capture and transfer of iodized organic compounds into follicle lumen through apical membranes of thyreocytes. This violation causes the Pendred syndrome, a hereditary disease characterized by sensorineural hearing loss and a relatively mild disturbance in the synthesis of thyroid hormones.

In addition to the reasons presented above, there are also exogenous and endogenous substances that can inhibit the secretion of thyroid-stimulating hormone: thyroid analogues; dopamine and its analogues (dopamine receptor agonists); somatostatin and its analogues; dobutamine; glucocorticoids (only acute, transient effect at large doses); interleukins -1p and -6; tumor necrosis factor-a; bexarotene (retinoid X receptor agonist); phenytoin; thyrostimuline (direct TSH receptor agonist) – heterodimer, synthesized in the adrenal cortex and placenta, has very high affinity with thyrotropin receptors (experience has shown that thyrostimuline leads to an increase in the concentration of thyroid hormones and a decrease in TSH production) [4, 5].

Table 1

Spectrum of iodine deficiency pathology (WHO, 2007)

Intrauterine period	Abortions Stillbirth Congenital anomalies Increasing perinatal and child mortality Endemic cretinism (mental retardation, deaf mute, strabismus, hypothyroidism, dwarfism) Psychomotor disorders
Newborns	Neonatal hypothyroidism General learning disability Increased absorption of radioactive iodine in nuclear disasters
Children and adolescents	Goiter (Subclinical) hypo- and hyperthyroidism Disruption of mental and physical development Increased absorption of radioactive iodine in nuclear disasters
Adults	Goiter and its complications Hypothyroidism Spontaneous hyperthyroidism of the elderly Iodide-induced thyrotoxicosis Cognitive impairment Increased absorption of radioactive iodine in nuclear disasters

It can be concluded from the above that iodine deficiency leads to thyroid diseases such as endemic diffuse and nodular goiter, mental and physical retardation of children, cretinism,

miscarriage, and a significant increase in the risk of radiation-induced thyroid cancer in case of nuclear disasters. According to official statistics (form No. 12 of the Russian Federal State Statistics Service) as of January 1, 2016, more than 50% of the constituent entities of the Russian Federation are iodine deficiency, more than 60% of the population lives in regions with moderate and/or mild natural deficiency of this trace element. In the Russian Federation, the number of persons with thyroid diseases, the vast majority of which arose as a result of ID, reached 3,035,753 people, including 235,226 children aged 0–14 years, 133,580 adolescents aged 15–17 years, 2,666,947 adults (Table 1) [1, 6].

It is worth noting that 703,062 were the patients with endemic goiter associated with iodine deficiency and 1,028,830 were the patients with other forms of non-toxic goiter.

All measures for the prevention of IDD are based on the norms of physiological consumption of iodine [7, 8]. ID-related diseases are completely preventable only when population prophylaxis with iodized salt is conducted (its use in nutrition, including the food industry, primarily bread baking). Individual and group prevention with physiological doses of iodine should also be carried out. The prescription of pharmacological preparations containing a strictly fixed dose of potassium iodide allows to effectively fill the increased needs of the body in this trace element (for example, Iodomarin®100 or Iodomarin®200). Adequate iodine prophylaxis during pregnancy and during breastfeeding allows to significantly reduce the risk of developing iodine deficiency conditions, including reducing the incidence of iodine deficiency thyreopathies, the elimination of endemic cretinism, the improvement of the intellectual capacity of children, and, in the long run, to affect the social development of the population as a whole.

Conflict of interest. The authors declare no conflict of interest.

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GUNSHOT INJURY: PROBLEMS OF DIAGNOSTICS; ANALYSIS OF EXAMINATIONS IN BARNAUL (2012-2017)

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The article describes the results of a statistical analysis of death in a gunshot injury. In the course of the study, the archive material of the morgue of Barnaul was used. The dynamics of mortality, the frequency of occurrence of morphological signs characteristic of a gunshot injury were determined.
Key words: *gunshot injury.*

The peacetime gunshot injury attracts increased attention not only of the public, including forensic medical one, but also of law enforcement and administrative bodies. Forensic medical examination of gunshot injuries is known to be one of the most complex and labor-intensive types of expert activity requiring the use of a complex of specialized, laboratory and instrumental methods of research, perfect organization of work, staff training and technical support [1, 2, 3, 4]. Undoubtedly, the conduct of expert examinations of a gunshot injury at a high quality level determines the success of further investigation and resolution of special forensic, situational and other tasks, contributing to the truth of the case. In the works of domestic and foreign authors devoted to forensic medical examination of injuries caused by guns, clear recommendations of objective assessment of death circumstances are not given, an adequate algorithm for forensic medical examination of corpses has not been developed, criteria for rational choice of laboratory methods and comprehensive assessment of results of conducted expert studies has not been established [5].

The purpose of the study is to analyze archival materials of mortality from gunshot injuries for the period of 2012–2017.

Research tasks:

1. Examine the expert's conclusions in a gunshot injury.
2. Get generalized indicators of death in a gunshot injury.
3. Determine the frequency of occurrence of morphological signs characteristic of a gunshot injury.

Materials and methods

Archival materials of the KSBHI "Altai Bureau of Forensic Medicine" concerning gunshot injuries were analyzed for 2012–2017, a period characterized by a significant decrease in this type of damage, which, in our opinion, is due to the relative stability of the social economic situation in the Russian Federation. The analyzed materials of the "Altai Bureau of Forensic Medicine" allowed us to objectively assess forensic medical and criminal data, social characteristics of the dead.

Results and discussion

During the period from 2012 to 2017, 16165 examinations of corpses were carried out in the "Altai Bureau of Forensic Medicine". Concerning violent death, 4388 examinations of corpses (27% of the total number of examinations of corpses) were carried out; from them, the death came from a gunshot injury in 29 cases (0.2% of the total number of examinations of corpses; 0.7% of the total number of examinations of corpses as a result of violent death). Of these, 5 cases (17%) were registered in 2012, 9 cases (31%) in 2013, 4 cases (14%) in 2014, 3 cases (10%) in 2015, 2 cases (7%) in 2016, 6 cases (21%) in 2017. According to the time of the year, the studied material was distributed as follows: in summer, there were 3 cases (10%), in autumn – 7 cases (24%), in winter – 8 cases (28%), in spring – 11 cases (38%). In the study of the dynamics of daily death rates from gunshot injuries on the days of the week, we can conclude that there is no clear correlation between the number of deaths from gunshot injuries and the day of the week.

Of the total number of observations, death occurred at the scene in 20 cases (69%); in 9 cases (31%), the victims were hospitalized to medical institutions in Barnaul. The majority of cases occurred in the apartment – 12 cases (42%) and non-residential premises – 9 cases (31%), 8 cases (27%) occurred in the street.

During the analyzed period, in most cases of death there were suicide – 27 cases (93%), murders – 2 cases (7%), and it is important to note that the majority of suicides took place in the morning hours – 15 cases (51%); in turn, murders were committed in the evening in 5 cases (17%) and in the night in 9 cases (31%).

The number of men died significantly prevails over the number of women – 26 cases (90%) versus

3 (10%). When studying the age structure, it is necessary to draw a conclusion about the highest incidence of gunshot injuries in age groups 18–44 years – 10 cases (35%) and 45–59 years – 12 cases (41%), with gradual reducing in the future.

In terms of the number, all gunshot injuries for the period 2012–2017 were divided into single – 26 cases (88%) and multiple – 3 cases (12%). In the practice of forensic medical expert, there were most often gunshot injuries of the head, neck, trunk. As a rule, neck injuries were accompanied by simultaneous presence of gunshot injuries on the head, and therefore it was decided to combine them into one group – 15 cases (51%). Damage to the trunk amounted to 8 cases (27%). In addition, there were multiple gunshot injuries to several areas of the body, such as head, neck, trunk, which allowed to form the third group – a combination of several areas – 6 cases (22%).

According to Order N 346n of 12.05.2010 "On approval of the procedure for the organization and production of forensic medical examinations in state forensic institutions of the Russian Federation", there is a list of external signs which must be noted by the forensic expert when visiting the site of the corpse. The analysis showed that at the scene in 100% of cases, a description of putrid phenomena was present; a description of the body's location, position of the body, description of the gun, damage to clothes, character, localization, presence of shoes on both legs, description of the wound, its shape, size, edges, presence of contusion collar, rubbing, muzzle imprint, presence of traces of close shot, presence of soot on hands were described only in 3 cases, which is only 10% of the total number of forensic examinations.

In the external examination, a forensic expert most frequently noted the following signs: traumatized areas, description of the entrance gunshot wound, its shape, measurement from the CSA and from the median line, contusion collar – in 29 cases (100%); in turn, measurement from the palm surface of the hand was not performed in any of the 29 cases, the size and edges of the entrance wound were described in 3 cases (10%), the "minus tissue" defect – in 10 cases (35%), the wound canal – in 5 cases (17%).

In 20 cases (69%), a through-and-through wound was described, in 9 cases (31%) – a nonperforating wound.

In the vast majority of observations – 22 cases (76%) – the close distance of the shot was observed; in 7 cases (24%), the shot was made at point-blank range. In cases of suicide, shot damage caused at point-blank range or from the close distance prevailed.

At the time of injury, 20 people (68%) were in a state of alcoholic intoxication; of them, the light degree of alcohol intoxication was noted in 6 people (30%), the average degree – in 10 people (50%), the severe degree – in 4 people (20%).

Conclusion

As a result of the study, it was established that the percentage of death from gunshot injury in the structure of violent death in Barnaul is low, with one third of the victims dying from complications in medical institutions. Most often, men of working age die from a gunshot injury in a state of alcoholic intoxication. The structure of a gunshot injury changed, in particular, shot injuries prevailed. Violations of the requirements of Order N 346n of 12.05.2010 "On approval of the procedure for the organization and production of forensic medical examinations in state forensic institutions of the Russian Federation" during the examination of a corpse at the site were revealed.

Conflict of interest. The authors declare no conflict of interest.

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MEDICAL AND SOCIAL PORTRAIT OF THE FEMALE INHABITANTS OF ALTAI KRAI, WHO SUFFERED THE NEAR-MISS CASE

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The article describes the results of the study of the medical and social portrait of the female inhabitants of Altai Krai, who have suffered near miss cases associated with severe preeclampsia/eclampsia and massive obstetric haemorrhages, and analyzes the structure of massive obstetric haemorrhages from the perspective of a risk strategy. The clinical and statistical analysis of medical records of women who early gave birth due to critical obstetric condition before and after the development of the risk strategy was carried out.
Key words: *medical and social portrait, near-miss case, risk strategy.*

Maternal health is one of the eight Millennium Development Goals that emerged from the 2000 Summit on the basis of the United Nations Millennium Declaration (UN) [1]. However, the problem is not solved to this date. More than 800 women die every day from complications related to pregnancy or childbirth. In many countries, the subject of systematic study is an in-depth analysis of severe obstetric complications, "Near miss maternal morbidity" cases. According to WHO experts, "...possible but not occurring maternal mortality cases (MM) – Maternal near miss – are cases when a woman was at death but survived the complication that occurred during pregnancy, childbirth, or within 42 days after the end of pregnancy..." [2]. According to a number of researchers, the amount of such severe complications causing loss of women's health is many times (30 times) higher than the amount of MM, which is very valuable information for analysis and organizational decision-making. For example, according to a number of studies, the near miss coefficient per maternal mortality by 2015 in the UK was 1 : 118, and in Russia – 1 : 30 [3, 4].

Critical obstetric conditions (COC) are essentially the main determinant of the level and structure of MM, and timely diagnosis and prevention of these conditions can significantly increase the reproductive capacity and preserve women's health. According to several researchers, improvement of maternal health conditions can only be achieved when a reduction in the number of deaths is accompanied by a decrease in the incidence of "almost dead" women who survived obstetric catastrophe [5]. That is why near miss cases are of great scientific and practical interest for healthcare at the present stage.

Research objective: giving a medical and social portrait of a woman who suffered a near miss case in Altai Krai, associated with the development of massive obstetric haemorrhage or severe preeclampsia/eclampsia, as well as analyzing the structure of massive obstetric haemorrhages from the perspective of the risk strategy and assessing the role of blood-saving technologies in their correction.

Research tasks: to assess the anamnestic data, characteristics of pregnancy and delivery of women who have undergone critical obstetric conditions; to analyze them from the perspective of the risk strategy and readiness of the service to urgent help; to analyze changes in the structure of massive obstetric haemorrhages before and after the implementation of the risk strategy; and to assess the role of blood-saving technologies in their correction.

Materials and methods

The clinical and statistical analysis of medical records of women who early gave birth due to COC before and after the development of the risk strategy was carried out. Four clinical groups were formed taking into account the nosology of obstetric complications and the stage of the study (n=143). Before developing the risk strategy, the groups were as follows: Group I – patients with massive obstetric haemorrhages (n=27), group II – patients whose pregnancy was complicated by severe preeclampsia/eclampsia (n=55). After the implementation of the risk strategy, the groups were as follows: Group III – patients with massive obstetric haemorrhages (n=27), group IV – patients whose pregnancy was complicated by severe preeclampsia/eclampsia (n=34). The inclusion criteria in the I–IV study groups at the second stage were:

– presence of critical obstetric conditions (obstetric haemorrhage, preeclampsia/eclampsia);

– early termination of pregnancy within 22–36.6 weeks of gestation.

The exclusion criteria of the study were the following:

– cases of COC from other causes related and

unrelated to pregnancy;

– termination of pregnancy in less than 22 weeks and more than 37 weeks of gestation.

All pregnant women were delivered in maternity facilities of Altai Krai. The conclusions were based on the results of mathematical and statistical data processing performed with the help of the package of statistical programs Microsoft Excel 2010, Statistica 7, Medcalc (9.3.5.0), SigmaPlot.

Results and discussion

The age structure of pregnant women was between 17 and 41 years. The average age of women after the development of the risk strategy was significantly higher and amounted to 30.2±4.8 years, 27.8±4.9 years, 32.9±4.5 years, 31.7±5.1 years in groups I, II, III and IV respectively ($p<0.05$). Occupational employment and marital status of the patients had no statistically significant differences.

Women with severe preeclampsia prior to the development of the risk strategy had secondary and less frequent higher education compared to patients whose pregnancy was complicated by severe preeclampsia/eclampsia after the development of the risk strategy ($p<0.05$).

In most cases, patients had a serious somatic history. In women whose pregnancy was complicated by severe preeclampsia and obstetric haemorrhages in childbirth, cardiovascular, endocrine, and urinary tract diseases were revealed with no reliable group differences ($p>0.05$).

The average age of menarche in patients was identical and amounted to 13.2±1.4 years, 13.6±1.4 years, 14.0±1.3 years, 13.3±1.3 years in comparison groups, respectively ($p>0.05$). The sexual debut took place in 17.6±1.7, 18.0±1.7, 17.1±1.6, and 18.5±1.7 years in comparison groups, respectively ($p>0.05$).

There have been some changes in the obstetric history of women in comparison groups since the development of the risk strategy. Among the patients whose delivery was complicated by obstetric haemorrhage, the multiparous ones with the presence of a scar on the uterus ($p<0.05$) were reliably predominant. One in three patients in group I and one in two patients in group III had a history of reproductive losses.

As for the assessment of the gynecological history, one in three women whose pregnancy was complicated by severe preeclampsia considered herself to be gynecologically healthy.

Patients with severe preeclampsia have become more likely to reveal anemia after the introduction of the risk strategy. There has also been an increase in the number of women who gave birth through caesarean section with massive obstetric haemorrhages after the introduction of the register ($p<0.05$), it is due to changes in their structure: an increase in the frequency of complete placenta previa and separation of the normally located placenta.

Thus, the medical and social portrait of women with COC before and after the implementation of the risk strategy is identical and has the following characteristics: age over 30 years, secondary/secondary vocational education, various occupational or household employment, registered marriage, rebirth, burdened obstetric gynecological history, the presence of cardiovascular and endocrine diseases.

As a result of the analysis of the structure of obstetric haemorrhages, it was revealed that in the period 2008–2012 every third haemorrhage was regarded as hypotonic and occurred at all levels of assistance with the same frequency. One in five haemorrhages was associated with premature separation of the placenta and complete placenta previa (ingrowth), with most of these patients concentrated in level II assistance hospitals (Figure 1).

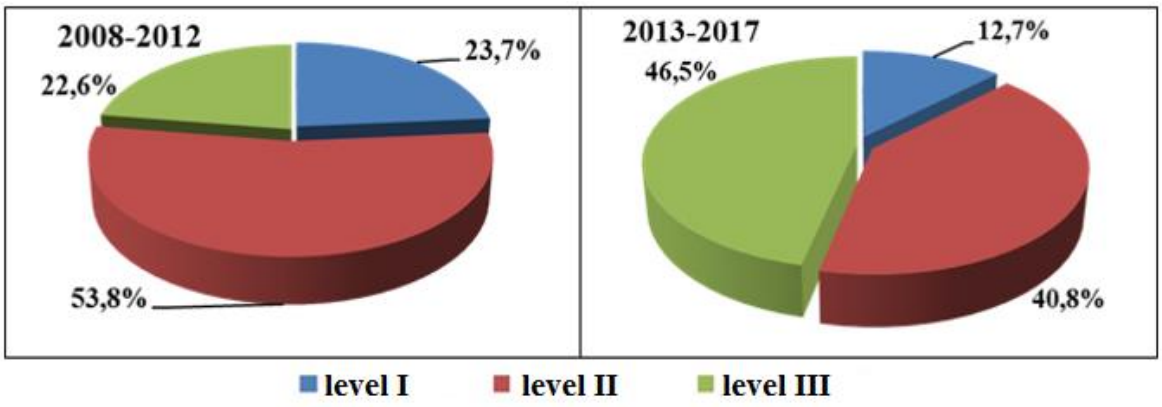

Figure 1. Distribution of haemorrhages by levels of institutions in 2008–2012 and 2013–2017.

In the period 2013–2017, the number of haemorrhages associated with complete placenta previa (ingrowth) against the background of pronounced destructive changes in the uterine

wall increased, especially in the presence of two or more scars on the uterus (42.1%). The technology of delivery of these pregnant women is always associated with pathological blood loss, even with the use of blood-saving technologies. It should be noted that after 2013 the vast majority (73.0%) of these pregnant women were delivered in obstetric hospitals of level III with all necessary conditions (autoplasma donation, uterus balloon tamponade, and instrumental reinfusion of autoerythrocytes). The remaining cases of haemorrhages were recorded in level II facilities, which could be regarded as a negative fact indicating the faults of the organizational system. In particular, the lack of prenatal diagnosis and underestimation of the severity of complications led to the death of the patient in the medical organization of level II in 2016. The first attempts to collect autologous plasma in patients with high risk of haemorrhage were made back in 2007 in the clinical perinatal center. In the next 10 years, this method was actively developed and proved to be effective as a technology of blood-saving and prevention of post-transfusion complications. After the introduction of a risk-oriented approach and concentration of patients with complete placenta previa (ingrowth), multifetal pregnancy, large uterine fibroid in obstetric hospital of level III, there is an increase in the volume of prepared autoplasma by 1.7 times. The introduction of controlled uterus balloon tamponade technology in 2012 has significantly reduced the number of organ-resecting surgeries in hypotonic haemorrhages occurring after natural childbirth and significantly reduced the amount of blood loss. Thus, in 2013–2017, hysterectomy was performed only in one case with inefficiency of conservative methods of treatment of hypotonic haemorrhage. The effectiveness of this method is also evidenced by the analysis of the volume of blood loss. Until 2012, the average amount of blood lost in this complication was 2170 ml, after the use of the method it decreased by 1.7 times and amounted to 1250 ml. With complete placenta previa, in the period 2008–2012, the average volume of blood loss was 1850 ml, in the period 2013–2017 – 1050 ml. During the period 2013–2017, 255 women with complete placenta previa were given birth in CPC, of which 68 patients had ultrasound signs of placenta growth into the uterine wall at the stage of prenatal diagnosis. 49 (72.1%) patients had hysterectomy and 19 women (27.9%) had organ-preserving surgery. In addition, during this period, there were 10 cases of incomplete uterine rupture, including scars, in which 6 women (60.0%) had uterine removal and 4 women (40.0%) were managed to perform organ-preserving surgery using various technologies of blood saving. There were no cases of hysterectomy with complete placenta previa in the period 2013–2017, whereas in 2008–2012 uterine removal was performed in 8.3%. The complex use of modern blood-saving methods for 10 years led to a 3-fold decrease in the frequency of use of blood preparations. Thus, complying with the risk strategy, the following positive results were achieved:

– absence of lethal outcomes from haemorrhages with predominance in the structure of more severe obstetric complications (placenta previa (ingrowth);

– increase in the number of organ-preserving surgeries;

– reduction of the average amount of blood loss after natural childbirth in hypotonic haemorrhages and after operative delivery due to placenta previa;

– reduction of the use of donor blood and its preparations.

Conclusions:

1. Clinical and statistical analysis of patients with critical obstetric conditions (obstetric haemorrhages and severe preeclampsia) showed that the patients had an identical medical and social portrait before and after the development of the risk strategy in the region. They were generally over 30 years old, with secondary/secondary vocational education, married, with various occupational or household employment, multiparous with a burdened obstetric gynecological history, suffered from cardiovascular and endocrine diseases.
2. In the period 2013–2017, there was a sharp increase in the frequency of caesarean sections (from 55.6% to 96.3%) in the group of women with obstetric haemorrhages due to an increase in cases of complete placenta previa/growth against the background of pronounced destructive changes in the uterine wall, especially in the presence of two or more scars.
3. In 73.0% of cases, pregnant women with massive obstetric haemorrhages after the introduction of the risk strategy were given birth in a level III facility with the developed blood-saving technologies: autoplasma donation, uterus balloon tamponade, and instrumental reinfusion of autoerythrocytes. Despite the absolute increase in the frequency of haemorrhage, this allowed to reduce their severity by virtue of reducing the volume of blood loss, the absence of posthemorrhagic and posttransfusion complications, increasing organ-preserving operations.

Conflict of interest. The authors declare no conflict of interest.

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HYPOKALEMIC PERIODIC PARALYSIS: ETIOLOGY, PATHOGENESIS, CLINICAL PICTURE. DESCRIPTION OF THE CLINICAL CASE

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Acute paralysis is a condition that requires a quick, thorough and correct diagnosis to choose the right treatment tactics, the timely start of which allows to achieve recovery or reduce the severity of the consequences of the disease. This article describes a clinical case of hypokalemic periodic paralysis, which is a fairly rare disease capable of leading to certain difficulties in diagnosis, but with proper treatment, there is a complete regression of the clinic.
Key words: *hypokalemia, hypokalemic periodic paralysis, paroxysmal myoplegia.*

Hypokalemic periodic paralysis (HPP) is a rare disease characterized by attacks of flaccid paralysis of skeletal muscles (weakness or inactivity) due to their loss of ability to activate and contract as a consequence of pathological changes on membranes of muscle cells with unchanged contractile apparatus of myocytes [1, 4, 5].

The pathology incidence is 0.4–1.25 cases per 100 000 population [3, 5]. Attacks are most often manifested in childhood or adolescence, but may also develop later. The mean age for symptoms onset is 15–35 years [2].

By nature, hypokalemic periodic paralysis can be hereditary or secondary (symptomatic). This disease has autosomal dominant mode of inheritance with increased penetration of the gene in men (3:1) [5].

Hypokalemic periodic paralysis is of particular interest among doctors, on the one hand, as the most common disease (up to 70%) among potassium metabolism pathology with its content in blood serum less than 3.5 mmol/L, and on the other, as the pathology difficult to diagnose [1]. Common features with paralytic myopathy of other etiology are: reduction or absence of tendon reflexes, generalized muscle weakness, paralysis lasting from one hour to several days.

Episodic attacks of limb muscle weakness usually during sleep and early morning are typical for this nosology. Provoking factors are physical load the day before, stressful situations, eating food rich in carbohydrates and sodium. Such patients have no limb muscle movements; there is tetraparesis or paraparesis, decreased muscle tone, lack of deep tendon reflexes with preservation of sensitivity. In this pathology, patients remain conscious [1].

Description of the clinical case

The patient, a young man of 20 years old, emergently entered the therapeutic department of the City Hospital No. 8 on 01.05.2017, with complaints of weakness, decreased muscle tone, vomiting.

The current deterioration of the condition was noted in the morning of 01.05.2017, when weakness in the hands occurred and increased, and then in the legs, vomiting occurred. Parents called the emergency medical service which provided first aid with introduction of asparcam, but the drug could not be administered due to blood rheology changes connected with severe hypokalemia.

When entering the reception room of the hospital, the condition was severe. The consciousness was clear, the speech was inhibited, the "crazy" eyes were noticed. The patient noted the blurring of vision. Objectively: meningeal symptoms were negative. Swallowing was not disturbed. Active movements in the limbs were difficult; fingers of the hands were crooked. Muscle tone was reduced. Tendon reflexes on arms and legs were reduced, D=S. With palpation, the soreness of the upper and lower limbs was revealed. Sensitivity was preserved, D=S. Breath was superficial, 21 per minute. Arterial blood pressure amounted to 140/90 mm Hg, Ps – 77 BPM. The temperature was 36.6°C.

During oral collection of history, it was found that the patient previously had similar attacks. It was also established in the survey that the patient was diagnosed in January 2015: chronic pyelonephritis against the background of congenital anomaly of the urinary system (exstrophy of bladder after surgery, bilateral hydronephrosis), continuously – relapsing course. Stage 2 chronic kidney disease was revealed.

Electrolyte disorders were observed in the biochemical blood analysis: K – 3.06 mmol/L, Na – 146 mmol/L, Ca – 2.22 mmol/L, creatinine – 132 mmol/L, urea – 10.0 mmol/L, uric acid – 186 mmol/L.

Correction of hypokalemia was carried out by intravenous administration of potassium chloride. The condition of the patient began to improve on the 3rd day, weakness in the limbs decreased, the

patient was able to move fingers. On the 4th day, the patient started walking on his own. He was diagnosed hypokalemic periodic paralysis of unclear genesis, severe course. Chronic pyelonephritis against the background of congenital anomaly of the urinary system. Stage 2 CKD. Secondary arterial hypertension.

When the patient was discharged from the hospital, no complaints were filed, the condition was satisfactory. Recommendations on adherence to a diet enriched with potassium, a healthy lifestyle, asparcam, potassium drugs orally under the control of potassium content in the blood serum were given.

In the retrospective analysis of medical records, four attacks of hypokalemia with acute development of muscle weakness were revealed; the patient was hospitalized after two of them. The first attack occurred at the age of 17 (January 2015), when against the background of general weakness, headache, the patient noted the development of muscle weakness, the lack of movement in the hands and weak one in the legs. This was accompanied by decreased blood pressure and vomiting. On the same day, the emergency medical service crew delivered him to the City Hospital No. 8, the department of neurology. The examination was performed, which revealed flaccid tetraparesis, deep sensitivity preserved, myalgic syndrome, pelvic organ function was controlled. The patient and his parents refused the lumbar puncture. During the examination, a sharp decrease of K – 1.06 mmol/L in the blood serum was determined. Correction with potassium chloride was performed 4 times a day. By the end of 3 days of treatment, there was a positive trend: active movements in the hands and legs appeared, the patient could sit without assistance. On day 5, the K level reached 4.0 mmol/L and the patient was discharged in satisfactory condition on the same day with full restoration of functions.

Rehospitalization with similar symptoms took place in a year (February 2016). Deterioration of condition in the form of general weakness, the lack of movement in the hands, delay urination appeared after suffering ARVI. He was hospitalized in the neurology department, where the condition sharply worsened during examination, there was dysarthria, dysphagia. Pronounced tetraparesis with muscle atony developed along with progressive respiratory failure with respiratory arrest for 7 seconds. The patient was transferred to the ICU of the city hospital, where he stayed for 3 days. He was on a ventilator. On the 2nd day, breathing recovered, a gradual regression of motor, bulbar and respiratory disorders began. Potassium of the blood serum in dynamics was as follows: 1.6–1.8–3.2–3.7–4.3 mmol/L. The course of therapy included hypokalemia correction with potassium chloride 4% – 120.0 in 5% glucose solution, ascorbic acid, mildronate. The patient was discharged on the 7th day with improvement.

Two subsequent attacks in April and May 2017 were also accompanied by motor impairment, general weakness. During examination, the K level constituted 3.06 mmol/L. Correction was carried out by intravenous injection of potassium chloride. The condition improved, hospitalization was not required.

This clinical case demonstrates the difficulties of differential diagnosis of hypokalemic periodic paralysis with some neurological diseases, such as Guillain–Barré acute inflammatory demyelinating polyneuropathy. The peculiarity of this clinical observation is the severity of hypokalemia attacks with the rapid development of ascending flaccid tetraplegia accompanied by paresthesia, myalgias, vegetative and pelvic disorders, the addition of bulbar and severe respiratory disorders. However, the Guillain–Barré syndrome is not characterized by sharp decrease in blood potassium level in entry, rapid and complete regression of symptoms in recovery.

For the prevention of attacks in hypokalemic periodic paralysis, as a rule, carbonic anhydrase inhibitors are recommended: acetazolamide and dichlorphenamide. However, in this clinical case, these drugs are contraindicated to the patient due to pathology of the urinary system. Therefore, such patient should use potassium-sparing diuretics, such as triamterene from 25 to 100 mg/day or spironolactone from 25 to 100 mg/day [4]. Acute attacks are stopped by taking potassium (orally or intravenously). Preventive treatment is aimed at reducing the frequency and intensity of attacks of muscle weakness. Trigger factors need to be identified and eliminated if possible. The diet should be low in carbohydrates (60–80 g per day) and rich in potassium (dried apricots, raisins, potatoes). In the future, it is recommended to take potassium chloride in courses.

Thus, in the development of episodes of muscle weakness it is necessary to pay special attention to the level of potassium in the blood serum, electrolytes. With age, the frequency of attacks may decrease, but there may be a constant weakness of the proximal muscles of the limbs.

Conflict of interest. The authors declare no conflict of interest.

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EFFECT OF MESENCHYMAL CONNECTIVE TISSUE DYSPLASIA ON HUMAN VISUAL ANALYZER

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The purpose of the work is to determine the most common pathology of the visual analyzer and its manifestations in CTD and to identify concomitant pathologies from other organ systems. A survey was conducted among people with CTD, the results of which served as a basis for the identification of people with a visual disorder. Survey results: the number of surveyed amounted to 98 people, of them: with CTD – 33 people, without CTD – 65 people. Of 33 people with CTD, there were other diseases of the visual analyzer: myopia – 21 people (63%), color blindness – 4 people (12%), retinal detachment – 6 people (24%), nystagmus – 1 person (4%), strabismus – 5 people (15%). The number of students without CTD amounted to 65 people, 44 of them have diseases of the visual analyzer: 3 people – signs of nystagmus (7%), 18 people – signs of myopia (41%), 9 people – signs of strabismus (21%), 4 people – signs of retinal detachment (9%) and 10 people – signs of hypermetropia (22%). It was revealed that myopia in the majority of students manifests in school years (88%) and is accompanied by astigmatism (17%). From the above, myopia is the most common pathology of the visual analyzer. On the part of other organ systems in students with CTD, it was revealed that non-progressive myopia and headaches of tension are more common in people with mild degree of joint hypermobility – 67% (headaches – 78%).

Key words: *connective tissue dysplasia, myopia, non-progressive myopia, astigmatism, headache of tension, mild joint hypermobility.*

Urgency: the circumstances that give relevance to connective tissue dysplasia were studied. These circumstances include: firstly, the high frequency in the population (up to 20%); secondly, the risk of development of various complications from other organs and systems; thirdly, the predominance of patients of young and therefore able-bodied and childbearing age. The main disorders in the study of connective tissue dysplasia were the pathologies of the human visual analyzer, as these disorders are common among people who do not have connective tissue dysplasia.

Research objective: on the basis of the data obtained during the survey, to determine the dependence of the frequency of manifestations of visual disorders on the presence of mesenchymal connective tissue dysplasia in humans. Besides, it is necessary to determine the most manifested pathology of the visual analyzer in CTD and to identify pathologies from other organ systems.

Materials and methods

In order to study the frequency of visual disorders in people with connective tissue dysplasia, a survey was conducted through social networks, the main task of which was to identify people with connective tissue dysplasia, as well as manifestations of various disorders of the visual apparatus in people with this pathology. 98 students studying at the Altai State Medical University participated in the research.

Results and discussion

Of the students who have joint hypermobility syndrome, myopia was found to be the most common visual disorder – 21 people (63%). The frequency of other disorders is as follows: color blindness – 4 people (12%), retinal detachment – 6 people (24%), nystagmus – 1 person (4%), strabismus – 5 people (15%). According to the results of a sample of 65 people without CTD: 21 people have no signs of visual analyzer disorders (32%). 44 people (68%) without CTD have signs of visual disorders, of which: 3 people – signs of nystagmus (7%), 18 people – signs of myopia (41%), 9 people – signs of strabismus (21%), 4 people – signs of retinal detachment (9%), and 10 people – signs of hypermetropia (22%). Myopia manifests itself in different periods of life, in most of the surveyed – in school years (8–15 years) – 88%, and progresses to 20–25 years. Myopia is very often accompanied by astigmatism (lack of a single focus of rays on the retina due to the presence of different curvature of eye optical systems). The incidence of astigmatism in CTD is 17%. There is no clear image of objects on the retina. Most cases of astigmatism depend on the irregular curvature of the cornea.

It has been studied that non-progressive myopia is more common in people with mild joint hypermobility – 67% (14 people). In this group, visual disorders were observed gradually.

The rest of the students make up a group with severe joint hypermobility – 33% (7 people), they rectify their vision with glasses or contact lenses.

Near-sightedness has a progressive character in this group.

It was studied that patients with headache had an increased frequency of such manifestations of CTD as myopia (91% of students with headache compared to 9% in other forms of headaches). 75% of students with joint hypermobility syndrome suffer from headache of tension, which is 2 times more than in the group of students without signs of CTD.

There is a dependence revealed that in students with myopia headaches occur more often in case of mild joint hypermobility (78%), they have the character of dull, pressing pain after overexertion.

Frequent, severe headaches are observed in students with myopia who have severe joint hypermobility (22%), but they are less common.

Conclusion

From the above data, it is possible to conclude that the frequency of occurrence of visual disorders is higher in people with mesenchymal connective tissue dysplasia. Myopia is found to be the most frequent disease in both studied groups. Myopia manifests in school years in the majority of students and is accompanied by astigmatism.

Visual disorders in connective tissue dysplasia slowly progress in students with mild joint hypermobility. Headaches are more likely to occur with pronounced connective tissue dysplasia, which indicates a pronounced collagen deficiency and leads to these consequences.

Conflict of interest. The authors declare no conflict of interest.

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