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MEDICINE AND SPORT

Тошкент

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СОДЕРЖАНИЕ

СПОРТИВНАЯ МЕДИЦИНА

NEUROPSYCHOBIOLOGICAL AND GENETIC FACTORS IN INCREASING PERFORMANCE OF ATHLETES IN CERTAIN SPORTS <i>Mavlyanov I. R., Usmonalieva N. Sh.</i>	6
ЮҚОРИ ЖИСМОНИЙ ФАОЛИЯТ ВА СОҒЛОМ ТУРМУШ ТАРЗИНИ ТАЪМИНЛАШДА ГЕНЕТИК ОМИЛЛАРНИНГ РОЛИ <i>Курганов С.К., Мавлянов И.Р., Рахимова Н.М., Пулатов О.Р., Ризаев З.Р., Абдазов Б.Б., Авезова М.З.</i>	10
СПОРТДА ТЕРАПЕВТИК ИСТИСНОЛАР: МУАММОЛАР ВА ЕЧИМЛАР <i>Солиев А.Б., Садиқов А.А.</i>	21
ПСИХОЛОГИЧЕСКИЙ ПОДХОД В ФУТБОЛЕ: КЛЮЧ К УСПЕХУ <i>Атабаева У. М.</i>	26

КЛИНИЧЕСКАЯ МЕДИЦИНА

ОЁҚЛАР ВАРИКОЗ КАСАЛЛИГИ БИЛАН ОҒРИГАН БЕМОРЛАРНИ ДАВОЛАШНИНГ ТУРЛИ УСУЛЛАРИНИ ЯҚИН ДАВРДАГИ НАТИЖАЛАРИНИ ҚИЁСИЙ БАҶОЛАШ <i>Абдуллажанов Б.Р., Болтаев А.А.</i>	28
ОЁҚЛАР ВЕНАСИ ВАРИКОЗ КЕНГАЙИШИ КАСАЛЛИГИ МУАММОСИНИНГ ЗАМОНАВИЙ ТАЛҚИНИ <i>Абдуллажанов Б.Р., Болтаев А.А.</i>	34
CLINICAL AND LABORATORY FEATURES OF POST-INFECTIOUS GLOMERULONEPHRITIS IN CHILDREN: DEVELOPMENT OF AN HTML-BASED EDUCATIONAL PROGRAM FOR MEDICAL STUDENTS <i>Abdullaeva D. T., Akramkhujaeva A. B., Saloni Sajid Maner</i>	38
COVID-19 КАСАЛЛИГИНИ ЭТИОПАТОГЕНЕТИК ВА ПАТОФИЗИОЛОГИК ЖИҲАТДАН ДАВОЛАШДАН КЕЙИН КУЗАТИЛАДИГАН УЗОҚ МУДДАТЛИ АСОРАТЛАРНИНГ МИНТАҚАВИЙ ҚИЁСИЙ ТАҲЛИЛИ <i>Нурбаев Ф.Э., Мавлянов И.Р., Ҳазратов Ў.Ҳ., Омонов О.Ю., Олимов А.Р.</i>	42
COVID-19 ДАВРИДА ИММУНИТЕТНИ ЗАИФЛАШИШИ НАТИЖАСИДА ТУБЕРКУЛЁЗ СПОНДИЛИТИНИНГ РИВОЖЛАНИШИ <i>Мамажонов И. М., Ширанова Ш. А.</i>	49
ИНВАГИНАЦИОННЫЕ ТЕХНОЛОГИИ АНАСТОМОЗИРОВАНИЯ ТОНКО-ТОЛСТОКИШЕЧНОГО СЕГМЕНТА В КОЛОРЕКТАЛЬНОЙ ХИРУРГИИ С ИСПОЛЬЗОВАНИЕМ AI <i>Абдуллажанов Б.Р., Зайнидинов Х.Н., Таджибаев Ш.А., Абдурашидов Ф.Ш., Азимов Б. Р., Саминжонов Х.У.</i>	52
ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ И ИНВАГИНАЦИОННЫЕ АНАСТОМОЗЫ В ХИРУРГИИ: АНАЛИТИЧЕСКИЙ ОБЗОР СОВРЕМЕННЫХ ДОСТИЖЕНИЙ И ВЫЗОВОВ <i>Абдуллажанов Б.Р., Абдурашидов Ф.Ш., Таджибаев Ш.А., Саминжонов Х.У.</i>	57
ПСОРИАТИК АРТРИТ ЖИГАРНОАЛКОГОЛ ЁҒЛИ КАСАЛЛИГИ БИЛАН БИРГА КЕЧИШ ХУСУСИЯТЛАРИ <i>Мухсимова Н. Р.</i>	61
QANDLI DIABET 2 TIPNING DAVOMIYLIGI, DIABETIK NEYROPATIYANING VA UYQU SIFATINING BUZILISHINI BEMORLAR HAYOT SIFATIGA TA'SIRI <i>Urunbayeva D.A., Shavkatxo'jayev X.N., Abdullayeva Ch.A.</i>	64
РАСПРЕДЕЛЕНИЕ ПОЛИМОРФНЫХ ЛОКУСОВ ГЕНА ИНТЕРЛЕЙКИНА IL10 (C592A) ПРИ ЯЗВЕННОЙ БОЛЕЗНИ И ОЦЕНКА ИХ ВКЛАДА В МЕХАНИЗМЫ ФОРМИРОВАНИЯ ЗАБОЛЕВАНИЯ <i>Хамраев А.А., Турсунова М.У., Нурмухамедова Н.С., Абдуллаев У.С.</i>	70
ЗНАЧЕНИЕ КАЛЬЦИЯ И МИКРОЭЛЕМЕНТОВ В ЛЕЧЕНИИ И ПРОФИЛАКТИКЕ ОСТЕОПЕНИЧЕСКИХ СОСТОЯНИЙ <i>Хаялиев Р.Я., Абдусаломов С.А., Мазимова Д.Э.</i>	73
БОЛАЛАРДА ХЕЛИКОБАКТЕРИОЗ БИЛАН БОҒЛИҚ СУРУНКАЛИ ГАСТРОДУОДЕНИТДА КОМОРБИД ПАТОЛОГИЯНИНГ КЛИНИК КЎРИНИШЛАРИ ХУСУСИЯТЛАРИ <i>Худайберганова Н.Х., Ахмедова И.М., Тухтаева Н.Х.</i>	81
PSORIATIK ARTRITNING TURLI KLINIK SHAKLLARIDA QON ZARDOBIDAGI SITOKINLARNING KLINIK-DIAGNOSTIK ANAMIYATI <i>Muhammadiyeva S.M., Normayeva G.X., Raximzoda F.E., Shiranova Sh.A.</i>	84
GIPERURIKEMIYA VA PODAGRA KASALLIKLARIDA ICHAK MIKROBIOTASI DISBIOZINI DAVOLASH STRATEGIYALARI <i>Nabieva D.A., Shiranova Sh.A.</i>	88

СОДЕРЖАНИЕ

INFLUENCE OF PAINFUL FORM OF DIABETIC POLYNEUROPATHY ON THE QUALITY OF SLEEP IN PATIENTS <i>Urunbaeva D.A., Shavkatkhuzhaev H.N., Abdullaeva Ch.A.</i>	92
РИСК РАЗВИТИЯ ЗАБОЛЕВАНИЙ ПАРОДОНТА У БЕРЕМЕННЫХ В ОРТОДОНТИИ <i>Мавлонова М.А., Шамухамедова Ф.А., Сулейманова Д.А.</i>	98
РЕАБИЛИТАЦИЯ ТРЕМОРА ПРИ БОЛЕЗНИ ПАРКИНСОНА: МЕДИЦИНСКИЕ И СОЦИАЛЬНЫЕ АСПЕКТЫ <i>Имомжонова М.А., Саттарова Д.Б., Саидносиров О.К.</i>	100
ҚОН БОСИМИ КАСАЛЛИГИДА DRD2 ГЕНИ С>Т С2137Т RS 1800497 ПОЛИМОРФИЗМИ ГЕНОТИПЛАРИ БИЛАН БЕМОР КОМПЛАЕНТЛИГИ, ДАВО ЖАРАЁНИГА ТАРАФДОРЛИГИ, ҲАМДА ФЕЪЛ-АТВОРИЙ ВА ХАРАКТЕР ТУРЛАРИ ОРАСИДА АЛОҚАДОРЛИГИ ЖИҲАТЛАРИ <i>С.И.Мавлянов, И.Р.Мавлянов, З.И.Мавлянов, Н.Ш.Усмоналиева</i>	105
ПРИМЕНЕНИЕ АППЛИКАТОРА КУЗНЕЦОВА И СУ ДЖОК ТЕРАПИИ В РЕАБИЛИТАЦИИ ПАЦИЕНТОВ С СИНДРОМОМ ГИЙЕНА-БАРРЕ: МЕДИЦИНСКИЕ И СОЦИАЛЬНЫЕ АСПЕКТЫ <i>Саттарова Д.Б., Мухаммеджанов Э.А., Саидносиров О.К.</i>	112
ВЫЯВЛЕНИЕ ГЕНОТИПОВ ИНФЕКЦИИ H. PYLORI - ПУТЬ К ПЕРСОНИФИКАЦИИ ФАРМАКОТЕРАПИИ <i>Мавлянов И.Р., Мусаева Д.М.</i>	115

INFLUENCE OF PAINFUL FORM OF DIABETIC POLYNEUROPATHY ON THE QUALITY OF SLEEP IN PATIENTS

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DIABETIK POLINEYROPATIYANING OG'RIQLI FORMASINING BEMORLAR UYQU SIFATIGA TA'SIRI

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ВЛИЯНИЕ БОЛЕЗНЕННОЙ ФОРМЫ ДИАБЕТИЧЕСКОЙ ПОЛИНЕЙРОПАТИИ НА КАЧЕСТВО СНА ПАЦИЕНТОВ

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Resume. The clinical study was conducted at the TMA multidisciplinary clinic, at the 2nd Department of Therapy and Endocrinology. In 120 patients with type 2 diabetes mellitus, the following results were revealed: in patients with diabetes mellitus, the subclinical form predominated in both groups - 56.9% and 60.9%. The clinical form was diagnosed in 43.1 and 39.1% of patients. 83.7% of patients have grade 1 obesity, 89.5% have left ventricular hypertrophy (LVH). Increased carbohydrate metabolism was found in both study groups compared to the control group. Among the patients' complaints, the most common were leg cramps - 93.1% in group 1, 87.3% in group 2, pain was noted by 85.5 and 45.8% of patients. When determining sleep quality using the Pittsburgh Questionnaire, the average sleep quality score for patients in group 1 was 10.89 ± 0.77 points ($p < 0.05$), which indicates unsatisfactory sleep quality in the examined patients. In patients without sleep disorders, this indicator was 4.92 ± 0.77 points. The most common complaint of patients was "feeling tired after waking up from a night's sleep", this complaint was reported by 100% of patients, 79.7% of patients reported "difficulty falling asleep after waking up", 78.4% 73.4% of patients suffered from "dissatisfied sleep", "shallow sleep with night awakenings", and 70.8% of patients "cannot sleep for more than 30 minutes". Neuropathic pain is associated with sleep disturbances, and clinicians must consider both aspects of treatment.

Keywords: diabetes mellitus, neuropathy, sleep, sleep quality, obesity, left ventricular hypertrophy.

Rezyume: Klinik tadqiqot 2-terapiya va endokrinologiya bo'limi negizida TMA ko'p tarmoqli klinikasida o'tkazildi. 2-toifa qandli diabet bilan og'riqan 120 nafar bemorda quyidagi natijalar aniqlandi: ikkala guruhdagi diabet bilan og'riqan bemorlarda subklinik shakl ustunlik qildi - 56,9% va 60,9%. Klinik shakl bemorlarning 43,1 va 39,1 foizida tashxis qo'yilgan. Bemorlarning 83,7 foizida 1-darajali semirish, 89,5 foizida chap qorincha gipertrofiyasi (LVH) bor edi. Ikkala tadqiqot guruhida ham nazorat guruhiga nisbatan uglevod almashinuvining ortishi aniqlandi. Bemorlarning shikoyatlari orasida oyoq kramplari eng ko'p uchraydi - 1-guruhda 93,1%, 2-guruhda 87,3%, og'riq 85,5 va 45,8% bemorlarda qayd etilgan. Pittsburg anketasi yordamida uyqu sifatini aniqlashda 1-guruhdagi bemorlarda uyqu sifati bo'yicha o'rtacha ball $10,89 \pm 0,77$ ballni ($p < 0,05$) tashkil etdi, bu tekshirilgan bemorlarda uyqu sifatining qoniqarsizligini ko'rsatadi. Uyqu buzilishi bo'lmagan bemorlarda bu ko'rsatkich $4,92 \pm 0,77$ ballni tashkil etdi. Bemorlar tomonidan aytilgan eng keng tarqalgan shikoyat "hushyor bo'lgandan keyin charchagan", deya xabar beradi "Kechasi uyg'ongandan keyin uxlash", 73,7%, bemorlarning 73,7%, 73,4% bemor 30,8% 30 daqiqagacha uxlay olmaydi ". Neyropatik og'riqlar uyqu buzilishi bilan bog'liq va klinitsyenlar davolanishning ikkala jihatini ham hisobga olishlari kerak.

Kalit so'zlar: qandli diabet, neyropatiya, uyqu, uyqu sifati, semirish, chap qorincha gipertrofiyasi.

Резюме. Клиническое исследование проводилось в многопрофильной клинике ТМА, на базе 2-го отделения терапии и эндокринологии. У 120 больных сахарным диабетом 2 типа выявлены следующие результаты: у больных сахарным диабетом в обеих группах преобладала субклиническая форма - 56,9% и 60,9%. Клиническая форма диагностирована у 43,1 и 39,1% больных. У 83,7% больных выявлено ожирение 1 степени, у 89,5% - гипертрофия левого желудочка (ГЛЖ). В обеих исследуемых группах выявлено повышение углеводного обмена по сравнению с контрольной группой. Среди жалоб пациентов наиболее распространенными были судороги в ногах - 93,1% в 1-й группе, 87,3% во 2-й группе, боль отмечали 85,5 и 45,8% больных. При определении качества сна с помощью Питтсбургского опросника средний балл качества сна у пациентов 1-й группы составил $10,89 \pm 0,77$ балла ($p < 0,05$), что свидетельствует о неудовлетворительном качестве сна у обследованных пациентов. У пациентов без нарушений сна этот показатель составил $4,92 \pm 0,77$ балла. Самой частой жалобой пациентов было «чувство усталости после пробуждения от ночного сна», данную жалобу сообщили 100% пациентов, 79,7% пациентов отметили «трудности с засыпанием после пробуждения», 78,4% 73,4% пациентов страдали «неудовлетворенным сном», «поверхностным сном с ночными пробуждениями», а 70,8% пациентов «не могут спать более 30 минут». Нейропатическая боль связана с нарушениями сна, и клиницистам необходимо учитывать оба аспекта лечения.

Ключевые слова: сахарный диабет, нейропатия, сон, качество сна, ожирение, гипертрофия левого желудочка.

Actuality. Today, the most common complications of diabetes mellitus are a group of clinical syndromes with damage to the peripheral and autonomic nervous system.

Syndromes of diffuse and focal damage to the nervous system, commonly known as various forms of neuropathy, occur in almost half of patients with diabetes mellitus [22].

The most common form of diabetic peripheral neuropathy (DPN) is the painful form of polyneuropathy or neuropathic pain.

Painful DPN can be acute or chronic. For the chronic form of the painful type of DPN, it is characteristic that the pain is waved, with periods of remission and exacerbation, and that the pain syndrome lasts more than 3 months. For neuropathic pain, the daily rhythm of symptoms is characteristic: until the evening and it increases at night. Symptomatics can be different: burning, sharp pain, stabbing pain, painful cramping, vein pulling. In most cases, sensory disturbances or absence of sensation and reduced or absent reflexes are observed along with the indicated symptoms.

The painless type slowly develops sensorimotor deficits, pain passes with minimal symptoms that do not exist. Typical complaints are numbness and tingling in the legs. In the objective view, it is determined whether various types of sensitivity decrease and reflexes are absent.

Damage to nerve fibers sometimes precedes the development of other complications of diabetes mellitus and may be the first clinical sign of a carbohydrate metabolism disorder. Pathological changes in nerves develop at the stage of impaired glucose tolerance, damage to unmyelinated nerve fibers occurs much earlier than to myelinated nerve fibers, and this leads to an increase in disability and even death [7,8].

The modern approach to the treatment of diabetic neuropathy focuses on improving glycemic control, improving lifestyle, and reducing neuropathic pain. The optimal therapeutic approach in patients with diabetes mellitus includes lifestyle modification, with an emphasis on diet and exercise with optimal control of lipids and arterial blood pressure. Glycemic control with a target HbA1c < 6% increases mortality in patients with diabetes mellitus but has little effect on diabetic neuropathy, so this target is not recommended as a standard of care. As part of a broader approach to good glycemic control, individualized treatment is considered the optimal choice for patients with diabetes mellitus.

Neuropathic pain causes sleep disturbances in patients, and sleep disturbances can in turn be a cause of increased pain. Based on this, it can be said that when treating neuropathic pain, it is necessary to improve sleep at the same time. Currently, there is a debate about the use of both pain-reducing and sleep-promoting drugs in patients. Anticonvulsants such as pregabalin and gabapentin improve neuropathic pain and are effective in comorbid sleep disorders. Opioids and antidepressants reduce pain but do not affect sleep.

Sleep disturbances occur in 50-80% of patients with chronic pain, and the severity of sleep disturbances depends on the intensity of the pain [4]. Sleep disorders and neuropathic pain are interrelated and should be treated simultaneously [4]. Despite the fact that improving sleep can reduce pain, the main focus of treatment today is on pain reduction [4].

The relationship between neuropathic pain and sleep disorders is bidirectional [5,6]. Patients with neuropathic pain develop sleep disturbances with greater extremity, and these sleep disturbances in turn lead to increased pain [6]. A positive correlation was found between pain sensitivity and sleep disorders. Patients with chronic pain and insomnia have been found to have decreased pain tolerance [7]. For example, the clinical evaluation process for neuropathic pain after spinal cord injury should also include an assessment of sleep quality [8].

The stages of diabetes mellitus diabetic peripheral

neuropathy are listed in the table below.

Classification of DPNs by severity (DyckP.J.)

Table 1

DPN degree	Characteristic
0 stage (DPN<->)	There are no clinical or electrophysiological signs of DPN
1, subclinical (DPN1)	Objective neurological signs and symptoms of DPN no If 2 changes are detected in EMG and quantitative autonomic examination.
Stage 2, clinical (DPN2)	Complaints specific to DPN . There may or may not be signs of sensitivity, movement, autonomic disorders, weakness of the flexor muscles of the leg (the patient cannot stand on the heels).
3 stage, severe (DPN3)	Neuropathy leading to behavioral disorders and/or social adaptation.

The unpredictability of the body's response to drugs that reduce neuropathic pain makes it difficult for doctors to choose and prescribe drugs [9]. Antidepressants, anticonvulsants, tramadol, opioids and other analgesics are used in the treatment of neuropathic pain [9]. International Pain Association (The Special Interest Group on Neuropathic Pain (NeuPSIG) of the International Association for the Study of Pain (IASP)) conducted a meta-analysis and systematic review of double-blind studies on the treatment of neuropathic pain. review was conducted [1,2]. The results of the study revised the NeuPSIG recommendations for the pharmacotherapy of neuropathic pain (tricyclic antidepressants, serotonin and noradrenaline reuptake inhibitors, first-line agents such as pregabalin and gabapentin, and less recommended second-line agents such as lidocaine, caspamin and tramadol). suggests an output [10].

Newer anticonvulsants such as pregabalin and gabapentin are effective in relieving neuropathic pain and comorbid sleep disorders [1]. Patients receiving gabapentin or pregabalin for neuropathic pain reported improved sleep duration and sleep saturation, as well as improved deep sleep and improved depression and anxiety [1,16,19]. Anticonvulsants such as oxcarbazepine, lamotrigine, gabapentin, and pregabalin may be used as second-line agents, such as baclofen (a muscle relaxant and antispastic agent) [19].

Trigeminal of neuralgia the first line cure as carbamazepine (anticonvulsant) offer done [11]. Diabetic neuropathy in pain pregabalin, gabapentin, venlafaxine, duloxetine, tricyclic antidepressants and of opioids benefits proved [2,3,9,14].

Opioids the pain reduce for enthusiasm with application need, but sleep in disorders support it won't be. From this except opioids when applied central sleep apnea such as in sleep breath get violation developed

Another one in case opioid receptor agonists in dysesthesia symptomatic and bother foot syndrome the pain improvement observed, this circumstances to sleep effect to do possible [15]. Antidepressants, depressed and without depression in patients to the pain depends sleep violation and chronic painful in patients help to give possible [18]. But tricyclic antidepressants, serotonin, norepinephrine again tie up inhibitors, special serotonin again tie up inhibitors bother foot syndrome strengthen possible [13].

Sleep for patients with DPN disorders are considered a serious problem, because sleep disorders and related diseases can affect the development of type 2 diabetes mellitus.

Diabetic neuropathy causes a significant deterioration in quality of life, especially if patients also have sleep disorders. Indeed, patients with diabetic neuropathy have a poorer quality of life than patients without neuropathy, and this difference begins and persists years before the diagnosis of neuropathy [17].

Neuropathic pain, sleep disorders with mutually depends being doctors in treatment both aspect as well to get need.

Research purpose. Study of sleep quality in patients with type 2 diabetes mellitus, complicated by painful type of diabetic peripheral neuropathy

Research materials and methods. The clinical study was conducted on the basis of the tta multidisciplinary clinic, in the 2nd department of therapy and endocrinology. 80 patients with diabetes mellitus type 2 were examined: fasting and postprandial glycemia, glyated hemoglobin (hbalc), lipid profile. Cardiovascular diseases were also present in patients with type 2 diabetes mellitus, hypertensive disease was found in 70% of them, and ischemic heart disease in 45%. The duration of diabetes mellitus disease was from 3 to 12 years, the average age of the examined was 56,6±9,8 years, of which 49 (61.3%) were women and 41 (38.7%) were men. The control group included 20 adult patients without diabetes mellitus, 5 (25%) of whom had ag, and the average age was 55,9±7,5 years.

Instrumental tests include ECG, EchoCG, ABP tests was conducted. Blood glucose control was carried out by biochemical method (SPINREACT, SAU kit). Glycated hemoglobin (HbA1c) testing was also performed by biochemical method (FILTERSAMPLER kit). Lipids (GC, TG, C- LDL, C-HDL) were determined by biochemical method (SPINREACT, SAU kit).

Standard methods of diagnosis of DPNs proposed in San Antonio in 1998 were used to evaluate the results of patient complaints and examinations. Accordingly, we used the following widely used scales: TSS (TotalSymptomsScore) – evaluation of the amount of complaints of patients on the last day, proposed by D. Ziegler. This scale assesses any typical positive neuropathic symptom (pins and needles, tingling, numbness, paresthesias), intensity and frequency of symptoms in the last 24 hours. Scores for all 4 symptoms were summed. Scores on the TSS scale ranged from 0 to 14,64. Quantitative evaluation of neurological changes during the clinical examination was carried out using the NIS-LL (Neuropathic Legs Score) scale [1], this scale includes: muscle strength, reflexes, tactile sensitivity (5 and 10 gram monofilament), pain (using a needle on the back surface of the distal phalanx of the big toe), vibration sensitivity (using a tuning fork with a frequency of 128 Hz, divided into 8 points on the back surface of the big toe three times, and the average value was determined), determination of muscle-joint sensitivity in the joints of the distal phalanges of the big toes. Temperature sensitivity was measured using a Thioterm (a cylinder with one end of glue and one end of metal) on the back surface of the big toes of both feet. During the examination, the patient's skin temperature was at least 32°C. NIS LL scale scores were calculated by summing the right and left legs and all scores. The maximum score of negative neuropathy symptoms was 28 points on the NIS LL scale.

The "Pittsburgh Sleep Quality Index Questionnaire (PSQI)" was used as a sleep assessment tool [16]. The Pittsburgh Sleep Quality Questionnaire was designed to assess sleep quality over the past month. The questionnaire consists of 19 items, which evaluate sleep through 7 components: subjective sleep quality, sleep latency, sleep length, subjective assessment of sleep adequacy, sleep disorders, use of sleep-inducing drugs, disturbances in daily

activities. This questionnaire is very easy to use and takes 5-10 minutes to complete.

The sum of points can range from 0 to 20: 0 to 5 indicates good sleep quality, and 6 and above indicates poor sleep quality. This scale has high sensitivity and specificity.

The obtained data are presented in the form of percentage or mean error (M±m). Statistical processing of the data was performed using the STATISTICA (version 9.0) program on the Windows system. Correlation analysis was carried out using Pearson's correlation coefficient to determine the relationship between the investigated indicators. p<0.05 was calculated as the criterion of statistical reliability of the obtained results.

Research results. Our study was conducted in the basis of 2 therapy and endocrinology of the TTA multidisciplinary clinic. After consenting to participate in the study, all patients were asked to complete a sleep quality assessment questionnaire.

The glycated hemoglobin index of the examined patients ranged from 7.5 to 10%, indicating unsatisfactory carbohydrate metabolism.

Based on the duration of diabetes mellitus disease, patients were divided into 3 groups:

1st group (24 people, 30%) – patients with chronic diabetes mellitus up to 1-3 years (men - 12, women - 12);

2 group (29 people, 36%) - patients in diabetes mellitus lasting from 3 to 6 years (men - 13, women - 16);

Group 3 (27 people, 34%) - patients with diabetes mellitus for more than 10 years (men - 11, women - 16).

All recruited patients suffered from a severe form of diabetes mellitus, while patients with severe complications of diabetes mellitus and severe comorbidities were excluded from the study. Patients taking oral hypoglycemic drugs were included in the study. Patients receiving insulin therapy were not included in the study.

Stages of DPN in examined patients depending on subjective and objective examinations

Table 2

Steps	1 group. 3-6 years n=24	2 groups. 6-9 years n=29	3 groups. 9-12 years n=27
0 stage (DPN<->)	2 (8%)	-	
Stage 1, subclinical (DPN1)	10 (42%)	5 (17%)	2 (7%)
Stage 2, clinical (DPN2)	12 (50%)	20 (69%)	19 (70%)
3 stage, severe (DPN3)	-	4 (14%)	6 (23%)

As can be seen from Table 2, the clinical and subclinical form of DPN prevailed in patients with 2 types of diabetes mellitus 1 examined - 50 and 42%. Stage 0 was found in 8% of patients. In our group 2, clinical DPN was detected in 69% of patients, and subclinical form was diagnosed in 17 and severe DPN in 14% of patients. In all 3 groups, clinical form of DPN was detected in 70%, subclinical form was detected in 7% of patients, severe form of DPN was detected in 23% of patients. As mentioned above, patients with severe diabetes mellitus 2 types (diabetic heel, gangrene patients were not included in the study).

Clinical characteristics of patients based on randomization

Table 3

Indicators of the examined patients	Control group n=20	1 group. 3-6 years n=24	2 groups. 6-9 years n=29	3 groups. 9-12 years n=27
Men	8 (40%)	12 (50%)	13(45%)	11 (41%)
Women	12(60%)	12 (50%)	16 (55%)	16 (59%)
Age	55,9±7,5	54,2±7,3	55,9±3,8	56,5±7,1
Body mass index, kg / m2	29,5±6,4	35,6±4,5	33,4 ±8,1	34,4 ±5,9
in anamnesis , (%)	5 (25%)	12 (50%)	20 (70%)	11 (40%)
Duration of diabetes mellitus years (average)	-	4,4	8,7	10,2
SAP, mm	133,5±11,3	152,4±11,7	157,2±13,5	157,7±14,3
DAP, mm	88,7±5,8	96,6±4,2	98,1±7,4	98,34±7,6
HB/ min	76,0±9,1	76,7±6,4	77,11±8,89	78,28±9,07
LVH , %	59,7%	72,9%	83,7%	89,5%
Angina F.C. I-II	-	5 (21%)	4 (13,8%)	8 (29,6%)

data in table 3 show that 8, 6, 7 % of patients have 1 degree of obesity and 82,1% have left ventricular hypertrophy (LVH). LVH, in turn, is considered the main predictor of death from cardiovascular causes.

When the results of the carbohydrate metabolism of the patients were analyzed, at the time of arrival, the carbohydrate metabolism parameters of all patients were evaluated as

unsatisfactory. Carbohydrate metabolism was elevated in both tested groups compared to the control group, including fasting glycemia by 31% in group 1, 48% in group 2, and 43% in group 3, postprandial glycemia by 37% in group 1, 52% in group 2, and 54% in group 3. and HbA1s increased by 20% in group 1, 37% in group 2 and 39% in group 3.

Blood biochemical indicators of patients with diabetes mellitus 2 type (M±m)

Table 4

Indicators	Control group n=20	1 group. 3-6 years n=24	2 groups. 6-9 years n=29	3 groups. 9-12 years n=27
Fasting glycemy, mmol /l	4,5±1,2	6,5±1,8*	8,5±1,0*	8,7±1,7*
Postprandial glycemy, mmol /l	6,3±1,0	10,1±2,3*	14,5±3,0*	13,9±1,0*
HbA1c, %	5,5±0,5	6,9±1,0*	8,9±1,0*	8,8±1,3*
General cholesterol, mmol/l	4,3±0,7	5,7±2,1*	6,1±1,7*	5,8±1,4
Triglycerides, mmol /l	1,5±0,08	2,14±1,3*	2,46±1,51*	2,51±1,82*
HDL, mmol /l	1,35±0,4	1,0±0,4*	0,88±0,33*	0,91±0,37*
LDL, mmol /l	2,9±1,8	3,49±1,5*	4,34±1,8*	4,02±1,30*

Note :*- there is reliability compared to the control group (p<0.05)

When the lipid profile indicators were examined in the patients, they were diagnosed with IIb phenotype dyslipidemia based on the primary dyslipidemia classification according to Fredrickson. Table 4 shows the high levels

of UX, triglycerides and LDL, and low HDL in patients. Unsatisfactory glycemic control and dyslipidemia are known to be risk factors for cardiovascular disease in patients with type 2 diabetes [8,21].

AG levels of patients with type 2 DIABETES MELLITUS

Table 5

GK levels	Control group n=20	1 group. 3-6 years n=24	2 groups. 6-9 years n=29	3 groups. 9-12 years n=27	Control group n=20	1 group. 3-6 years n=24	2 groups. 6-9 years n=29	3 groups. 9-12 years n=27
	Soni	%	Soni	%	Soni	%	Soni	%
Normal ABP	10	50	3	12.5	2	7	0	0
High normal ABP	5	25	6	25	9	31	6	22
AH 1 degree	4	20	14	58.5	12	41	13	48
AH level 2	1	5	1	4	6	21	8	30

Table 5 shows that patients with AH 1 and AH 2 levels predominated among the examined patients (59.2%). At the same time, 10.8% of patients with normal arterial blood pressure and 24.6% of patients with AH 3 degree were also

identified.

Complaints that indicate the presence of a clinical degree of DPN in patients are known and include: pain, tingling, paresthesias, and a burning sensation. In this study,

the degree of manifestation of DPN was evaluated using the TSS (TotalSymptomsScore) scale. In stages 2 and 3 of DPN,

77.8% of patients had positive neuropathic symptoms.

Individual symptoms of diabetic neuropathic symptoms frequency of manifestation according to TSS

Table 6

Complaints	1 group. 3-6 years n=24	2 groups. 6-9 years n=29	3 groups. 9-12 years n=27
Pain , %	76,3	85,5	45,8
Aggregation , %	60,5	93,1	77,3
Paresthesias , %	8,7	16,9	14,3
Burning sensation , %	12,8	23,9	24,1

Among the complaints of the patients, the most reported was leg cramps – 93,1% in 2 groups , 87,3% in 3 groups , 1 group while this the indicator is 60,5% organization made a pain complaint in group 1 of patients the most a lot person reported 76,3% in groups 2 and 3 while 85,5 and 45,8% of patients reported , and the pain worsens in the evening, a complaint such as a burning sensation in the legs – 12,8% of patients in 1st group, 2nd and 3rd groups and 23,9 and 24,1% of patients have paresthesia in the legs and the complaint is appropriate present in 12,9, 16,9 and 14,3% of patients respectively (Table 6).

At the next stage, the quality of sleep of patients with

diabetes mellitus was studied. The PSQI questionnaire was used as a tool for studying the quality of sleep. The questionnaire consists of 19 items and helps to assess the quality of sleep based on 7 components: subjective quality of sleep, sleep latency, sleep length, subjective assessment of sleep sufficiency, sleep disorders, use of sleep-inducing drugs, daily activity disorders. When determined using the Pittsburgh questionnaire, the average sleep quality index of patients in group 1 was 10,89±0,77 points ($p<0,05$), which indicates that the examined patients have poor sleep quality. In patients without sleep disorders, this index was 4,92±0,77 points.

Index of patients examined in the Pittsburgh questionnaire

Table 7

Groups	Control group n=20	1 group. 3-6 years n=24	2 groups. 6-9 years n=29	3 groups. 9-12 years n=27
Ball	4,81±0,65	6,16±0,39	8,74±0,91	10,89±0,77*

Note :*- there is reliability compared to the control group ($p<0.05$)

Conclusions:

1. In 42% of the 1st group of patients with type 2 diabetes mellitus , the subclinical stage of DPN was found in 50% of the clinical stage, and in 69% of the 2nd group of patients, the clinical stage and 14% of the severe DPN were found, in 3rd group of patients and the severe level of DPN was 23% and the clinical stage was 70%. It can be seen that diabetes mellitus 2 types of disease duration and DPN severity are correctly correlated.

2. The main risk factor for the development of DPN is hyperglycemia and dyslipidemia. At the same time, HbA1c levels in both groups were 37 and 39% higher, respectively, compared to the control group. Blood levels of bad lipids such as LDL are also elevated by 43 and 45%, respectively.

3. In 100% of patients with type 2 diabetes complicated by DPN, sleep quality disorders were found. This is due to the fact that the Pittsburgh questionnaire was 4,81±0,65 points in the control group , the average sleep index of patients in group 1 was 6,16±0,39 points, and in group 2 this index was 8,74±0,91 points. and 10,89±0,77* points in 3 groups ($p<0,05$). This further confirmed that the painful form of DPN diabetes mellitus 2 has an effect on the quality of sleep of different patients.

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