Impact Factor: 9.9 ISSN-L: 2544-980X

Pathogenetic Significance of Endogenous Intoxication in Chronic Tubulointerstitial Nephritis in Children

Akhmatov Ablokul [1]

abstract: The inflammatory process in the tubulointerstitial tissue (TI) of the kidneys progresses against the background of specific and nonspecific etiologic factors. Interstitial tissue (IT) of the kidneys is the focus of pathology in tubulointerstitial kidney damage, which subsequently covers the blood, lymphatic vessels and tubules of the renal stroma. The aim of the work was an attempt to assess the state of protein metabolism in chronic tubulointerstitial nephritis (CTIN) in children, taking into account the identified pathogenetic significance of the parameters of endogenous intoxication (EI). Patients and methods: 120 children with CTIN, aged from 4 to 15 years, were examined. Taking into account the clinical variant of CTIN, all patients were divided into 2 groups: Group 1 - 52 (43%) children with a recurrent form of CTIN and Group 2 - 68 (57%) patients with latent CTIN. Among them, there were 65 boys (54%) and 55 girls (46%). All patients underwent general clinical, laboratory and instrumental examination. Results: the studies showed that in the development of rCTIN and lCTIN, an important mechanism of damage to the IT kidneys, the development of clinical symptoms and the course of the disease is both a metabolic disorder leading to structural shifts at the level of various nephron elements and to changes in the functional state of the kidneys, and instability of the cytomembranes of tubular cells. This justifies the need for combined therapy in patients with CTIN, which will help eliminate the inflammatory process, excrete endotoxins from renal tissue, stabilize cellular cytomembranes and kidney function.

Key words: protein metabolism chronic tubulointerstitial nephritis; endogenous intoxication; instability of cytomembranes.

Relevance. Achievements in diagnostics and therapy of nephrological diseases in children are enormous, but nevertheless, in about 23% of patients the disease has a progressive course, which significantly affects the formation of quality of life. The inflammatory process in the tubulointerstitial tissue (TIT) of the kidneys progresses against the background of specific and non-specific etiological factors. The interstitial tissue of the kidneys is the focus of pathology in TIPP, which subsequently covers the blood, lymphatic vessels and tubules of the renal stroma.

Microscopic data of TIN are: infiltration (lymphoid or macrophage) of interstitial tissue with transition to loose or coarse fibrous sclerosis, dystrophy and/or atrophy of the tubular epithelium [3; 5; 7].

Research in recent decades has shown the important role of molecules of kidney damage in the origin of TIPP. They can participate simultaneously in many processes of endotoxin formation and their accumulation in the internal homeostasis of the body [1;2;6;].

A number of authors have noted that endotoxicosis is a cascade process.Despite the advances made in the treatment and prevention of CTIN in children,At present, there is no precise diagnostic algorithm for this pathology in the literature. Comparative clinical and laboratory diagnostics of the main types of tubulointerstitial nephritis has not been fully developed either. There is no data on the pathogenetic relationship between tubular functions and serum and urine protein metabolism indices in children with different forms of CTIN. The development of a new pathogenetically substantiated complex treatment for CTIN in children remains a significant research objective.

[1] Associate Professor of the Department of 2-Pediatrics, PhD in Medicine Samarkand State Medical University Uzbekistan

Purpose of the study. To assess the pathogenetic significance of endogenous intoxication in chronic tubulointerstitial nephritis (CTIN) in children.

Material and research methods. This study presents the results of examination and treatment of 120 children with CTIN, in the active inflammatory phase, who were in the pediatric nephrology department of the children's regional multidisciplinary scientific center of Samarkand, in the period from 2019-2021.

Taking into account the clinical variant of CTIN, all patients were divided into 2 groups: Group 1 - 52 (43%) children with a recurrent form of CTIN and Group 2 - 68 (57%) patients with latent CTIN. Among them, there were 65 boys (54%) and 55 girls (46%). Patients underwent general clinical, laboratory and instrumental examinations.

The clinical diagnosis of CTIN was made according to the diagnostic criteria proposed in the classification of N.A. Korovina (2003), where special attention was paid to the characteristics of the family history: determination of UTI, TIN, ICD, metabolic disorders in early age, which were symptoms of exudative-catarrhal diathesis, dysuric disorders against the background of crystalluria.

The control group consisted of 30 practically healthy children, not suffering from chronic diseases, not ill in the last 6 months, with a favorable nephrological family history, aged from 4 to 15 years.

Renal parameters were assessed during the period of exacerbation of the disease, during the period of formation of clinical and laboratory remission, 1 year, 2 and 3 years after the period of exacerbation. During the study, no children with CTIN were found against the background of severe congenital pathology in combination with impaired functional state of the kidneys.

The state of renal functions was assessed on the basis of two groups of functional methods:

Group I - methods indicating the quantitative state of renal functions of various parts of the nephron.

a) The state of the renal filtration function (endogenous creatinine clearance) was assessed using the Van Slyke formula:

Using immunotubidimetry on the Cobas Integra 400 plus apparatus (Roche, Switzerland), cystatin C was determined:

- is a protein that is formed in the nucleus of cells at a constant rate;
- has the property of free filtration in the glomeruli;
- Inversely correlates with SCF and is highly sensitive to its changes compared to its changes in creatinine [9].
- metabolized in the proximal tubules during reabsorption
- is formed regardless of gender, body weight or the presence of tumors and inflammatory processes;

To determine the concentration capacity of the kidneys, the Zimnitsky test was used. In addition, the value of ammonioacidogenesis was determined (titratable acids and ammonia were determined in daily urine).

Protein metabolism parameters (protein fractions, total serum protein, total and effective albumin concentration, serum toxicity index, albumin binding capacity) were determined in all patients examined. Serum urea and creatinine levels were also determined.

Results and discussion. The clinical group (group 1: 52 patients) with rCTIN was identified based on the presence of typical signs of the disease, such as dysuria (32.7%), neurogenic bladder (10%), swelling of the soft tissues of the eyelids in the morning (46.5%), and lower back pain (30.8%) against the background of physical exertion (26.9%).

Whereas, the clinical group (group 2: 68 patients) with lCTIN was identified based on a more constant symptom of "salt-losing kidney", which leads to the development of muscle hypotension - 41.2% (28) and arterial hypotension - 27.9% (19), dysuria - polyuria in 54.4% (37) of patients, the presence of

abacterial damage to renal tissue against the background of hyperoxaluria - 100% (68), an abundance of epithelium in 92.6% (63), lympho-monocytic cells - 88.2% (60), brown cylinders - 100% (68). Urine culture is sterile.

Diagnostic criteria for the latent course of CTIN: they were identified against the background of respiratory diseases, they did not receive due attention due to their short duration, and hereditary history was not taken into account.

In our studies, a high percentage of cases of continuously recurring form of CTIN was observed in children aged 10-14 years, which amounted to 43.2% of the total number of patients with continuously recurring form of CTIN.

We associate the recurrent course of the disease with the presence of a secondary immunodeficiency state, the indirect signs of which are: frequent recurrence (more than 2 times a year) and protracted course (preservation of clinical and laboratory signs for more than 6 months), short-term effect of the antibacterial therapy, multiple foci of chronic infectious pathology, susceptibility to acute respiratory viral infections.

In the clinical status of patients with chronic recurrent TIN, the frequency of exacerbation of the disease over the past period was determined and it was found that in 20 (38.7%) children the frequency of exacerbation was 1 time per year, in 19 (36.5%) children 2 times per year and in 12 (23.1%) children more than 2 times per year.

In all examined patients, protein metabolism parameters were determined (total serum protein, TCA, ECA, protein fractions, SSA, concentration of altered albumin and toxicity index, MPP in urine and blood, globulin fractions, concentration of cystatin C, indices of the functional state of albumin, urea and creatinine levels).

At present, it has been established that with the development of multiple organ and multiple system failure, metabolic products – endotoxins – accumulate in the body. Endotoxins include natural metabolic products that accumulate in the body in high concentrations, IPP – intermediate proteolysis products, variable products, heterogeneous in composition ingredients of non-viable tissues that accumulate in the body when natural detoxification mechanisms are suppressed and metabolism is disrupted [10]. There is a direct relationship between the degree of EI and the volume of IPP in the urine, depending on the severity of CTIN [11; 12].

Studies of kidney function and EI indices are necessary to predict the course of CTIN. The degree of damage to the membrane structures of kidney cells was assessed by the level of MPP and OCA in the urine, and by the total concentration of albumin, ECA, SSA, IT, and CIA in the blood.

The obtained data showed that the concentration of MPP in the urine of patients with rCTIN in the acute phase was 16.3 times higher than the control group (Table 1), while in children with lCTIN it was 8 times higher. More pronounced disturbances of cellular structures were noted in patients with rCTIN compared to patients with lCTIN.

The increase in the level of MPP in urine in CTIN is apparently associated with the fact that during inflammatory-destructive processes of the tubulointerstitial system, the reabsorption of MPP in the proximal tubules is disrupted, since they are reabsorbed there by 99.9%, as a result of which their excretion with urine is observed. The accumulation of MPP in urine is facilitated by a violation of the excretory function of the kidneys, leading to tubular atrophy and organic structural disorders.

Table 1.Parameters of EI in children with CTIN upon admission (M±m)

No.	Indicators	Healthy	Patients with rCTIN n=52	Patients with lHTIN n=68
in the blood				
1	MPP, unit of optical density	0.136±0.021	0.148±0.040 P>0.1	0.107±0.002 P>0.1
in urine				
1	MPP, unit of optical density	0.136±0.021	2.23±0.08 P<0.001	1.12±0.07 P<0.001

Both in the active stage and in remission in rCTIN, the state of protein metabolism was the same as in the acute course of the process. A significant decrease in the concentration of total serum protein in this pathology was uncharacteristic (67.6 ± 0.25 g / l) and TCA (49.23 ± 0.28 g / l). The protein-synthetic function of the liver compensated for small protein losses associated with a febrile state.

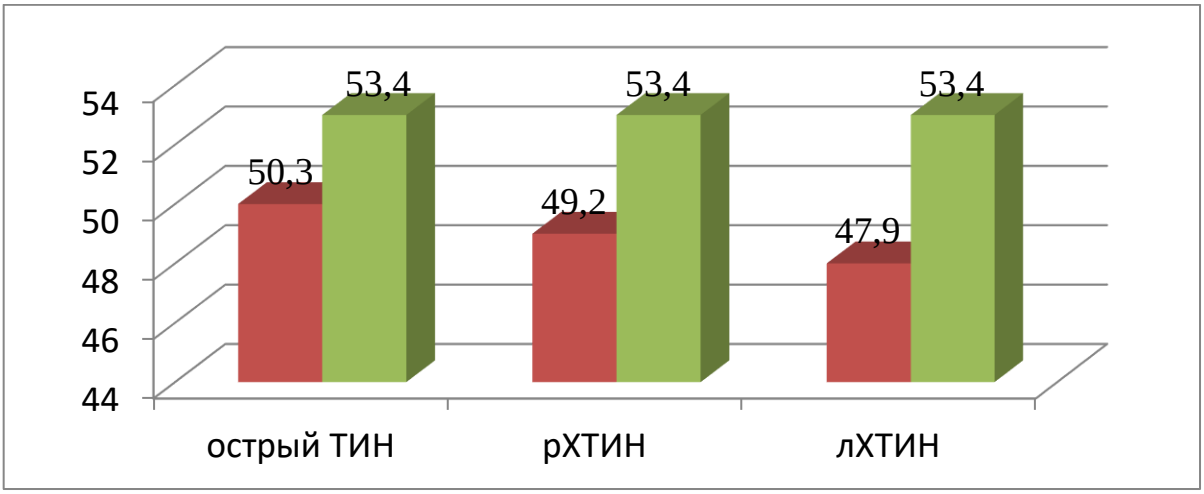

Fig. 1. The OKA index in the acute stage for various forms of the disease in children

In recent years, feverish conditions have been observed in patients rarely, and exacerbations of CTIN have been asymptomatic. The normal level of protein synthesis was maintained due to the absence of thermal inactivation of liver enzymes.

Table 2. Parameters of the functional state of albumin before treatment depending on the variants of the course of CTIN in children

Indicators	ABOUT (g/l)	OKA (g/l)	ECA (g/l)	KIA (g/l)	SCA (%)	IT conventional units
TIN Island	67.5±0.27 P>0.1	50.3±0.33 P>0.1	34.0±0.18 P<0.001	16.1±0.29 P<0.001	67.4±0.44 P<0.001	0.47±0.09 P<0.001
Relapse of TIN	67.6±0.25 P>0.1	49.23±0.3 P>0.1	32.04±0.26 P<0.001	17.1±0.37 P<0.001	64.8±0.65 P<0.001	0.54±0.01 P<0.001
LatentIN	64.7±0.37 P>0.1	47.9±0.24 P>0.1	33.6±0.3 P<0.001	14.3±0.38 P<0.001	69.7±0.72 P<0.001	0.43±0.01 P<0.001

Note: P-reliability of the difference between the indicators of healthy children and children with chronic TIN

The active phase of CTIN was characterized by a decrease in ECA, as in the acute process, but to a greater degree (32.04±0.26 g/l). The decrease in ECA was combined with a decrease in SS to 64.8±0.65% (Fig. 1).

In our opinion, the changes identified are associated with more active and long-lasting intoxication, which is the cause of excessive accumulation of toxic substances that contribute to the formation of endotoxicosis and disruption of homeostasis. The nature of intoxication, its severity in a particular form of the disease affects the rate of decay of protein structures.

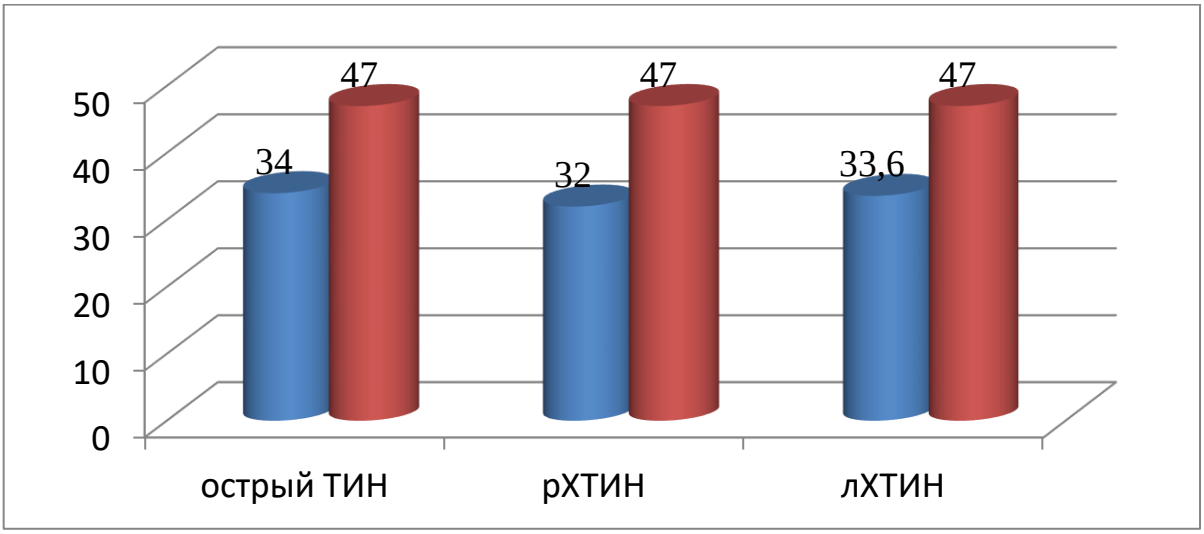

Fig. 2. The ECA index in the active stage in various forms of CTIN in children

A high level of toxicity index indicates the presence of intoxication, which is determined in all periods of the disease (Fig. 2).

Less pronounced but persistent changes in protein metabolism are characteristic of latent CTIN. Children are characterized by a decrease not only in ECA, but also in the overall one. We found that patients with a sluggish process in the kidneys had disturbances in the protein-synthetic function of the liver.

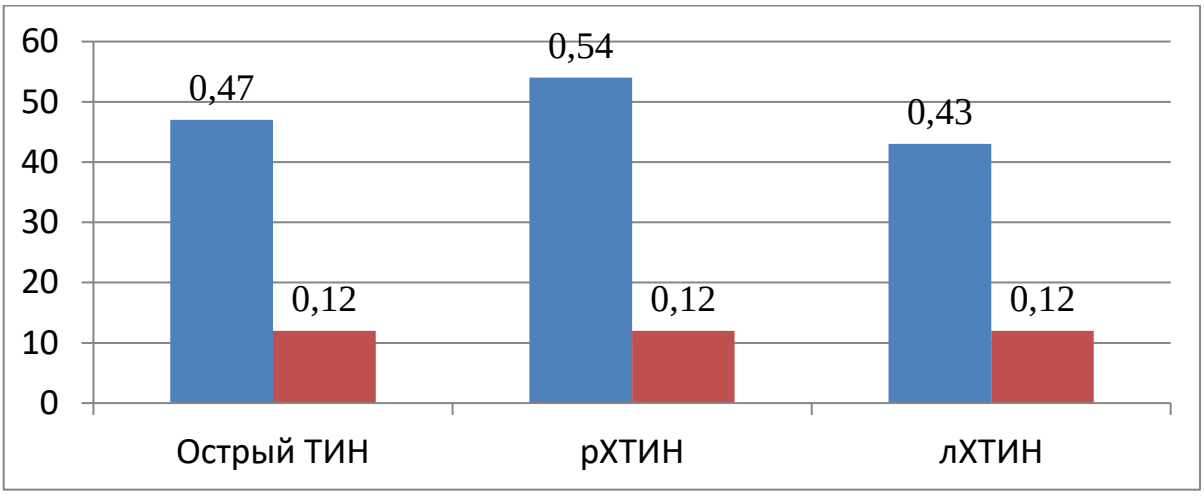

Fig. 3. The IT index in the active stage for various forms of the disease in children

Against the background of intoxication, immune disorders and sluggish inflammation in the body, the liver loses its ability to provide compensation for protein metabolism disorders. The level of ECA in lCTIN changes to a lesser extent, compared to rCTIN, which is associated with compensatory mechanisms in the liver.

An adaptive reaction against the background of a long-term pathological process is that albumin is synthesized in smaller quantities, but more complete.

High SSA helps to reduce the level of intoxication, unlike other variants of TIN, which indicates such an indicator as IT (Fig. 3). Such changes in albumin lead to the formation of chronic TIN, which indicates that the non-specific effector system of the body is functioning [4; 7].

In CTIN, despiralization of the protein molecule is observed. Conformational disturbances lead to the formation of discrete forms of albumin, as indicated by a decrease in the level of albumin binding capacity. Limited ability of albumin to bind drugs, this concerns antibiotics, which significantly affects the formation of the chronicity of the process.

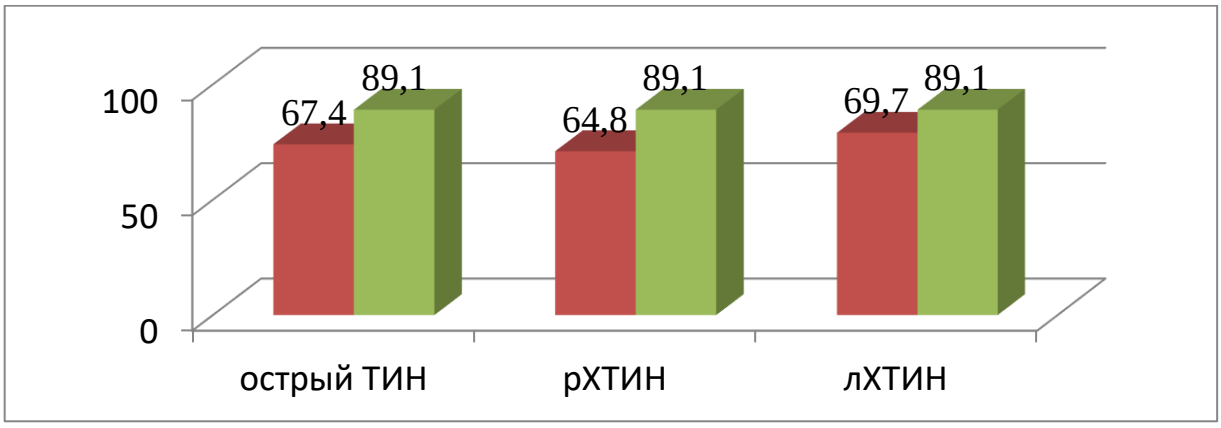

Fig. 4. SSA indicators in the active stage in various forms of CTIN in children

Conclusions. Thus, the conducted studies have shown that in the development of rCTIN and lCTIN, an important mechanism of damage to the interstitial tissue of the kidneys, the development of clinical symptoms and the course of the disease is both a metabolic disorder leading to structural shifts at the level of various nephron elements and to changes in the functional state of the kidneys, and instability of the cytomembranes of tubular cells.

References

1. Ахматов А, Ахматова ЮА. Белковый Метаболизм И Патогенетическая Роль Эндогенной Интоксикации При Хроническом Тубулоинтерстициальном Нефрите У Детей. *Educational Research in Universal Sciences*. 2024;3(4 SPECIAL):603-612.
2. Собирова ДШ, Закирова ЗШ кизи, Гаффорова ЧЕ кизи, Нормаматова ДФ, Эркинова НШ кизи. ГЕСТАЦИОННЫЙ САХАРНЫЙ ДИАБЕТ. World of Scientific news in Science. 2024;2(1):607-618.
3. Шухратовна НГ, Суратзода ЗМУХТЗ угли СМ, Шухратовна СД. ГОРМОНАЛЬНАЯ РЕГУЛЯЦИЯ. Multidisciplinary and Multidimensional Journal. 2024;3(2):9-18.
4. А.х С, И.б М, Б.п Н, М.э Б. ДИАГНОСТИКА И ЛЕЧЕНИЕ ТЕРМОИНГАЛЯЦИОННОЙ ТРАВМЫ. Research Focus. 2024;3(3):120-129.
5. Гульмухамедов ПБ, Ризаев ЖА, Хабилов НЛ, Бобоев КТ. ИЗУЧЕНИЕ УЧАСТИЯ ПОЛИМОРФНОГО ВАРИАНТА ГЕНА MTR (A2756G) В МЕХАНИЗМАХ РАЗВИТИЯ ВРОЖДЕННЫХ ПОРОКОВ ЧЕЛЮСТНО-ЛИЦЕВОЙ ОБЛАСТИ. INTELLECTUAL EDUCATION TECHNOLOGICAL SOLUTIONS AND INNOVATIVE DIGITAL TOOLS. 2024;3(31):64-68.
6. А.к Х, С.б Ш, С.д К, И.б М. НЕРЕШЕННЫЕ ПРОБЛЕМЫ ЛЕЧЕНИЕ БОЛЬНЫХ С ИНГАЛЯЦИОННЫМИ ТРАВМАМИ. Boffin Academy. 2024;2(1):64-74.
7. А.к Х, С.б Ш, Н.к С, И.б М. ОПТИМИЗАЦИЯ СОВРЕМЕННЫХ МЕТОДОВ ИНТЕНСИВНОЙ ТЕРАПИИ ПРИ ОЖОГОВОМ ШОКЕ. JTCOS. 2024;6(1):27-39.
8. А.к Х, С.б Ш, И.а Т, И.б М. ПОВРЕЖДЕНИЯ КИШЕЧНИКА ПРИ СОЧЕТАННОЙ ТРАВМЕ ЖИВОТА (Обзор литературы). Science and innovation. 2024;4(1):24-35.
9. Гульмухамедов ПБ, Ризаев ЖА, Бобоев КТ, Хабилов НЛ. ПОЛИМОРФИЗМ ГЕНА MTHFR (A1298C) И ВРОЖДЕННЫЕ ПОРОКИ ЧЕЛЮСТНО-ЛИЦЕВОЙ ОБЛАСТИ. INTELLECTUAL EDUCATION TECHNOLOGICAL SOLUTIONS AND INNOVATIVE

DIGITAL TOOLS. 2024;3(31):69-73.

10. Алиярович ХА, Бойназарович МИ. ПРИЧИНЫ ПАРАПРОТЕЗНЫХ РЕЦИДИВНЫХ ВЕНТРАЛЬНЫХ ГРЫЖ И ВЫБОР СПОСОБА ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ. EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE. 2024;4(11):161-168.
11. Бойназарович МИ, Алиярович ХА. ПРИЧИНЫ РЕЦИДИВА ГРЫЖИ ПОСЛЕ ГЕРНИОАЛЛОПЛАСТИКИ.
EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE. 2024;4(11):156-160.
12. Ахматов А, Ахматова ЮА. СОВРЕМЕННЫЕ ПОДХОДЫ К ДИАГНОСТИКЕ И ЛЕЧЕНИЯ ХРОНИЧЕСКОГО ТУБУЛОИНТЕРСТИЦИАЛЬНОГО НЕФРИТА У ДЕТЕЙ.
Центральноазиатский журнал междисциплинарных исследований и исследований в области управления. 2024;1(9):65-77.
13. Аблакуловна АЮ, Аблокул А. СОСТОЯНИЕ БЕЛКОВГО ОБМЕНА И ПАТОГЕНЕТИЧЕСКОЕ ЗНАЧЕНИЕ ЭНДОГЕННОЙ ИНТОКСИКАЦИИ У ДЕТЕЙ С ХРОНИЧЕСКИМ ТУБУЛОИНТЕРСТИЦИАЛЬНЫМ НЕФРИТОМ.
Eurasian Journal of Medical and Natural Sciences. 2024;4(5-2):97-107.
14. Hsu CY, Rizaev JA, Pallathadka H, et al. A review of new emerging biosensors based on bacteria-imprinted polymers towards pathogenic bacteria: Promising new tools for selective detection. Microchemical Journal. 2024;207:111918. doi:10.1016/j.microc.2024.111918
15. Rizaev JA, Sattorov BB ugli, Nazarova NS. ANALYSIS OF THE SCIENTIFIC BASIS FOR ORGANIZING DENTAL CARE FOR WORKERS IN CONTACT WITH EPOXY RESIN. Журнал гуманитарных и естественных наук. 2024;(15):280-283.
16. Sobirdjanovna KN, Abdumaruf A, Tolib B, Shavkat I, Dilorom O. Assessment of the Level of Knowledge of Residents of Samarkand Region about Osteoporosis. JSML. 2024;2(4):45-49.
17. Siddikovna TG, Davranovna A, Shuxratovna NG. Basic Mechanisms of Development, Diagnosis and Treatment of Acromegaly. International Journal of Alternative and Contemporary Therapy. 2024;2(4):26-29.
18. А.х С, И.б М, Б.п Н, М.э Б, Ж.а Р, Б.а Я. СОВРЕМЕННЫЕ ТЕХНОЛОГИИ В ХИРУРГИЧЕСКОМ ЛЕЧЕНИИ ОСТРОГО КАЛЬКУЛЕЗНОГО ХОЛЕЦИСТИТА. Research Focus. 2024;3(3):130-138.
19. Sabirdjanovna KN, O‘g‘li VSA, Baxtiyorovich MB, O‘g‘li MBG, O‘g‘li PLU, Dilorom O. Development of Sarcoidosis after Successful Treatment of Itsenko–Cushing’s Disease. JSML. 2024;2(5):91-98.
20. Aramovna DZ, Samariddin A, Bobir A, Abbos B, Ravza D. DIAGNOSIS AND INTENSIVE TREATMENT OF TYPE 2 DIABETES TO ACHIEVE THE TARGET LEVEL OF GLYCED HEMOGLOBIN AND REDUCE THE RISK OF VASCULAR COMPLICATIONS. Research and Implementation. 2024;2(4):26-35.
21. K.z A, J.a R, Sh.T A. DIAGNOSTIC AND PROGNOSTIC SIGNIFICANCE OF GINGIVAL FLUID CYTOKINES IN THE DEVELOPMENT OF INFLAMMATORY PERIODONTAL DISEASES. TAJMSPR. 2024;6(07):12-18. doi:10.37547/TAJMSPR/Volume06Issue07-03
22. Aramovna DZ, Suhrob R, Zuhraxon O, Dilovar Z, Muxlisa X, Dilorom O. DIAGNOSTIC AND TREATMENT METHODS OF HYPERPARATHYROIDIS. FAN, TA’LIM, MADANIYAT VA INNOVATSIYA JURNALI | JOURNAL OF SCIENCE, EDUCATION, CULTURE AND INNOVATION. 2024;3(6):1-9.
23. Sabirdjanovna KN, O‘g‘li RST, O‘g‘li XHA, Qizi QMM, O‘g‘li XBU, Qizi TSR. Diagnostic Aspects and Comparative Diagnostics of Thyroid Disease. JSML. 2024;2(5):99-106.
24. Rodrigues P, Rizaev JA, Hjazi A, et al. Dual role of microRNA-31 in human cancers; focusing on

cancer pathogenesis and signaling pathways. Experimental Cell Research. 2024;442(2):114236. doi:10.1016/j.yexcr.2024.114236

25. Daminov AT, Abilov SB ugli, Akhadov AA ugli, Yangabayev SG ugli, Kuchkarova MZ kizi. EFFECT OF NON-STEROID ANTI-INFLAMMATORY DRUGS IN THE TREATMENT OF RHEUMATOID ARTHRITIS. FAN, TA'LIM, MADANIYAT VA INNOVATSIYA. 2024;3(8):36-40.
26. Saadh MJ, Khalifehsoltani A, Hussein AHA, et al. Exosomal microRNAs in cancer metastasis: A bridge between tumor micro and macroenvironment. Pathology - Research and Practice. 2024;263:155666. doi:10.1016/j.prp.2024.155666
27. Sobirdjanovna KN, Yusufbek J, Suhrob O, Jamshid O, Dilorom O. Features of Use of Combined Glow-Lowing Therapy in Patients with Type 2 Diabetes and IHD. JSML. 2024;2(4):40-44.
28. Rizaev JA, Nazarova NS, Vohidov ER. HOMILADOR AYOLLARDA PARODONT KASALLIKLARI RIVOJLANISHINING PATOGENETIK JIHATLARI. Журнал гуманитарных и естественных наук. 2024;(11 [2]):104-107.
29. Djurayeva ZA, Rajabov L rustam o'g'li, Ibragimov A akmal o'g'li, Toshpulatov A yusuf o'g'li, Shomurodov L akobir o'g'li. HOMILADOR AYOLLARNING YENGIL YOD TANQISLIGI VA QALQONSIMON BEZ HOLATINI TAHLIL QILISH. Analysis of world scientific views International Scientific Journal. 2023;1(8):159-173.
30. Farrux E, Nurmuxammad X, Bekzod N, A DZ. Indicators of Renal Filtration Function in Elderly Patients with Arterial Hypertension in Association with Type 2 Diabetes Mellitus. EUROPEAN JOURNAL OF INNOVATION IN NONFORMAL EDUCATION. 2023;3(9):128-130.
31. Aramovna DZ, Diyorbek K, Diyorjon S, Akrom E, Feruz E, Dilorom O. IODINE DEFICIENCY CONDITIONS. PEDAGOGIKA, PSIXOLOGIYA VA IJTIMOIY TADQIQOTLAR| JOURNAL OF PEDAGOGY, PSYCHOLOGY AND SOCIAL RESEARCH. 2024;3(5):296-306.
32. Shukhratovna SD, O`g`li OUS, O`g`li SJG, Qizi RRO, Qizi MMB. MECHANISM OF SARCOIDOSIS AFTER CUSHING'S DISEASE. JOURNAL OF HEALTHCARE AND LIFE-SCIENCE RESEARCH. 2024;3(3):134-140.
33. Aramovna DZ, Sevinch U, Nigina S, Umidjon M, Maqsud I, Dilorom O. MODERN APPROACH TO THE TREATMENT OF TYPE 2 DIABETES MELLITUS. PEDAGOGIKA, PSIXOLOGIYA VA IJTIMOIY TADQIQOTLAR | JOURNAL OF PEDAGOGY, PSYCHOLOGY AND SOCIAL RESEARCH. 2024;3(5):307-317.
34. Shukhratovna SD, Qizi TAS, O`g`li OII, Hamzayevich NM, Qizi ODO. MORPHOLOGICAL AND FUNCTIONAL CHANGES IN THE ADRENAL CORTEX DURING POISONING. JOURNAL OF HEALTHCARE AND LIFE-SCIENCE RESEARCH. 2024;3(3):148-153.
35. Pallathadka H, Khaleel AQ, Zwamel AH, et al. Multi-Drug Resistance and Breast Cancer Progression via Toll-Like Receptors (TLRs) Signaling. Cell Biochem Biophys. 2024;82(4):3015-3030. doi:10.1007/s12013-024-01418-2
36. N.k I, I.b M, M.e B, Z.a J. NEW METHODS COMPARISON OF COST EFFICIENCY OF TISSUE EXTRACTION TECHNIQUES IN LAPAROSCOPIC SURGERY. Boffin Academy. 2023;1(1):303-313.
37. Sobirdjanovna KN, Mirkomil T, Siyovush S, Zoyirjon T, Dilorom O. Pros and Cons of Using a Combination of Glow-Lowing Drugs, In Particular Dpp-4 Inhibitors and Metformin in Patients with Type 2 Diabetes and Overweight. JSML. 2024;2(4):50-53.
38. Taxirovich DA, Jamshidbek E, Javohir O, Ravshan E, Feruz J, Jahongir Q. ROLE OF INFLAMMATORY CYTOKINES IN DIABETIC NEPHROPATHIES IN PREGNANT WOMEN WITH TYPE 1 DIABETES MELLITUS. PEDAGOGIKA, PSIXOLOGIYA VA IJTIMOIY TADQIQOTLAR | JOURNAL OF PEDAGOGY, PSYCHOLOGY AND SOCIAL RESEARCH.

2024;3(5):555-565.

39. Aramovna DZ, Islom I, Azizbek A, Zaxriddin S, Shohruh S, Dilorom O. ROLE OF VITAMIN D IN HYPERPARATHYROIDIS. FAN, TA'LIM, MADANIYAT VA INNOVATSIYA JURNALI | JOURNAL OF SCIENCE, EDUCATION, CULTURE AND INNOVATION. 2024;3(6):10-17.
40. Khaleel AQ, Alshahrani MY, Rizaev JA, et al. siRNA-based strategies to combat drug resistance in gastric cancer. Med Oncol. 2024;41(11):293. doi:10.1007/s12032-024-02528-w
41. Daminov AT, Kuchkorova MZ, xadov AA o`g`li, Yangabayev SG o`g`li, Abilov SB o`g`li. Sporadich Goitter. International Multi-disciplinary Journal of Education. 2024;2(8):112-120.
42. Daminov AT, Abilov SB ugl, Akhadov AA ugli, Yangabayev SG ugl, Kuchkarova MZ kizi. STUDYING THE CLINICAL AND LABORATORY COURSE OF NON-ALCOHOLIC FATTY LIVER DISEASE. FAN, TA'LIM, MADANIYAT VA INNOVATSIYA. 2024;3(8):41-46.
43. Daminov AT, Kuchkorova MZ, Axadov AA o`g`li, Yangabayev SG o`g`li, Abilov SB o`g`li. Subacute Thyroiditis. International Multi-disciplinary Journal of Education. 2024;2(8):121-129.
44. Mei S, Roopashree R, Altalbawy FMA, et al. Synthesis, characterization, and applications of starch-based nano drug delivery systems for breast cancer therapy: A review. International Journal of Biological Macromolecules. 2024;280:136058. doi:10.1016/j.ijbiomac.2024.136058
45. Obaidur Rab S, Altalbawy FMA, Chandra M, et al. Targeting the lung tumor microenvironment by phytochemicals and their nanoformulations. Pathology - Research and Practice. 2024;264:155679. doi:10.1016/j.prp.2024.155679
46. Eshnazarovna MS, Aramovna DZ, Ishnazarovich BS, Oromjonovna OS. The Development of the Economy in the Field of Tourism in Uzbekistan. EUROPEAN JOURNAL OF BUSINESS STARTUPS AND OPEN SOCIETY. 2023;3(2):71-73.
47. M F, E T, D K, Kurbanova NS. THE IMPACT OF NEW APPROACHES TO THE DIAGNOSIS AND TREATMENT OF GESTATIONAL DIABETES MELLITUS (GDM). Western European Journal of Modern Experiments and Scientific Methods. 2024;2(4):96-99.
48. Rizaev JA, Vohidov ER, Nazarova NS. THE IMPORTANCE OF THE CLINICAL PICTURE AND DEVELOPMENT OF THE CONDITION OF PERIODONT TISSUE DISEASES IN PREGNANT WOMEN. Central Asian Journal of Medicine. 2024;(2):85-90.
49. A RJ, A HF. The Relationship between Somatic and Dental Diseases. International Journal of Integrative and Modern Medicine. 2024;2(6):609-611.
50. Shukhratovna SD, Qizi UDA, Qizi SMS, O`g`li OAZ, Qizi ODO. TIMELY DIAGNOSIS AND TREATMENT OF IMPAIRED CARBOHYDRATE METABOLISM. JOURNAL OF HEALTHCARE AND LIFE-SCIENCE RESEARCH. 2024;3(3):141-147.