The Importance Of Uric Acid Level In Patients With Persistent Kidney Disease Of Predialysis Stages

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ABSTRACT
The study explores theory of relativity of acid levels with nephritic function, moreover as its role as a prognostic marker of cardio tube risk in chronic excretory organ diseases within the course of variable regression analysis, taking into consideration the adjustment of potential risk issues, the amount of uric acid was found to be a major factor influencing calculable capillary vessel filtration rate. The results of this study showed that elevated humor uric acid levels are related to the next risk of kidney malfunction.

Keywords: chronic kidney disease, uric acid, hyperuricemia, prognosis, capillary filtration rate, lipoprotein, low-density lipoprotein, creatinine

1. INTRODUCTION

Hyperuricemia is related to a poor quality of life joint dysfunction, reduced fertility and therefore the risk of death [6,7,10]. In recent decades, the prevalence of hyperuricemia multiplied because of an aging population, larger use of medicine which will cause hyperuricemia and blubber [5, 9, 13, 14]. Research information indicate that hyperuricemia is an freelance risk issue for cardiovascular morbidity and mortality in each ladies and men [1,2,11]. Given the prevalence and significance of hyperuricemia, it seems necessary to spot the factors that impede the best treatment of hyperuricemia in both women and men in order to confirm personal therapeutic measures.

At identical time, it's been evidenced that blood vessel hypertension leading to nephropathy is aggravated within the presence of such metabolic disorders as hyperuricemia, hyperglycemia and dyslipidemia. Even with an uncomplicated course of essential hypertension, a moderate decrease in capillary filtration rate (GFR) leads to a doubling of the danger of vessel mortality, with blood pressure (BP) within the vary of 130-139/85-89 mm Hg. is associated with an multiplied risk of developing proteinuria over two fold in comparison with patients with lower blood pressure.

An increasing variety of studies are work the attainable relationship of acid levels with nephritic function, particularly nephritic range proteinuria, and its role as a predictive marker of cardiovascular risk in chronic urinary organ diseases (CUOD).

The aim of our study was to research the relationship between uric acid levels and renal function, likewise as its role as a prognosticative marker of cardiovascular risk in CUOD.

2. MATERIALS AND METHODS

An expected research included 200 CUOD patients aged 34 to 70 (age 51.6 ± 1.1). The think about did not incorporate patients with CUOD length less than 5 a long time, with a single kidney, hemodynamically critical renal vascular stenosis, and oncological infections. All patients experienced common clinical and instrumental investigate. Testing patients was consist of a common examination, evaluation of complaints, collection of anamnestic information, distinguishing proof of chance components for the advancement and movement of CUOD. While taking a biochemical blood test, the parameters were indicated: urea, creatinine, remaining nitrogen, bilirubin, transaminases, uric acid. Fast blood tests were collected within the morning after at minimum 10 hours of fasting. Blood tests were handled in a clinical research laboratory. Serum glucose concentration was measured using an altered hexokinase enzymatic test. A research of the lipid range of blood was carried out: cholesterol, high thickness Lipoprotein (HTL), low-density lipoprotein levels (LDL), very low-density lipoprotein levels (VLDL), atherogenic coefficient (AC), triglycerides (TG). In order to assess the functional state of the kidneys, all patients were calculated GFR using the CUOD-EPI formula, modification 2011 CUOD was stratified by the degree of GFR decrease, as well as the degree of albuminuria, according to the classification of KDIGO 2013 and Scientific Society of Nephrologists of Russia 2012.

We found out the data of 200 hospitalized people with the pathology in order to study the main place of hyperuricemia as free risk factor for the rising and progression chronic uric organs disease. All sectors included blood pressure, uric acid levels and counted the rate of glomerular filtration.

3. RESULTS

The obtained information of the test illustrated the average concentration of uric acid in the group of examined people with CUOD C2 was 268.41 ± 15.33 μmol / L, the patients with CUOD C3a - 376.63 ± 18.46 μmol / L, patients with CUOD C3b - 371.82 ± 19.14, and patients with CUOD C4 - 291.94 ± 12.36. Compared to men with hyperuricemia, women with hyperuricemia were older (71 versus 61 years, p <0.001) and had a greater severity of comorbidities (p < 0.001, such as hypertension, diabetes mellitus, and obesity). Risk factors for hyperuricemia differed from women who were more likely to take diuretics (p <0.001), while men were more likely to have dietary triggers (p <0.05).

The analysis showed that the mean uric acid levels in patients with CUOD male above normal in 16 % (489.3 pmol / l), and in women - at 12 % (394.1 umol / l) (Table . 1).

Table 1
Biochemical parameters in the patients with pre-dialysis stages of CUOD

Index	CUOD C2 n = 114	CUOD S3a n = 48	CUOD S3b n = 28	CUOD C4 n = 10
Mitral Valve (MV), μmol / L, men, 202.3-416.5 μmol / L	268.41 ± 15.33	291.94 ± 12.36 $^{\Delta, \circ, \square}$	371.82 ± 19.14 *	519.63 ± 18.46 *

MV, µmol / l, women Norm 142.8-339.2	168.41 ± 15.33	291.94 ± 12.36 $^{\Delta, \circ, \square}$	329.82 ± 19.14 *	494.63 ± 18.46 *
Blood glucose, mmol / l	4.72 ± 0.25	5.54 ± 0.19 *, $^{\Delta}$	4.74 ± 0.18 $^{\Delta, \#}$	4.89 ± 0.17 $^{\Delta,}$
GFR, ml / min	75.60 ± 7.31	52.81 ± 7.49	37.95 ± 7.13 $^{*, \Delta, \#, +}$	25.80 ± 6.80 *
Cholesterol$_{total}$, mmol / l	5.26 ± 0.261	6.09 ± 0.213 *	5.29 ± 0.221 $^{\Delta, \#}$	5.53 ± 0.228 $^{\Delta}$
TG, mmol / l	1.43 ± 0.30	2.66 ± 0.115 *	2.88 ± 0.121 $^{\Delta, \#}$	3.49 ± 0.118 $^{\Delta}$

Note: * - $P < 0.05$ compared with control, Δ - $P < 0.05$ compared with the outcome, $\circ$ - $P < 0.05$ compared with 1gr., $\square$ - $P < 0.05$ compared with 3gr.

Patients with totally different age, it was conceivable to follow the relationship between the level of uric acid within the blood serum and the level of CUOD: among young men p> 0.05 (p = 0.06), k = 0.5; among the middle-aged patients - p <0.01 (p = 0.01), k = 0.9; among the elderly people - p <0.01 (p = 0.01), k = 0.9. among the people with middle age and elderly patients, a more stronger relationship was found between the level of uric acid and the process level of CUOD. An above average level of uric acid was found among the same people (Fig. 1).
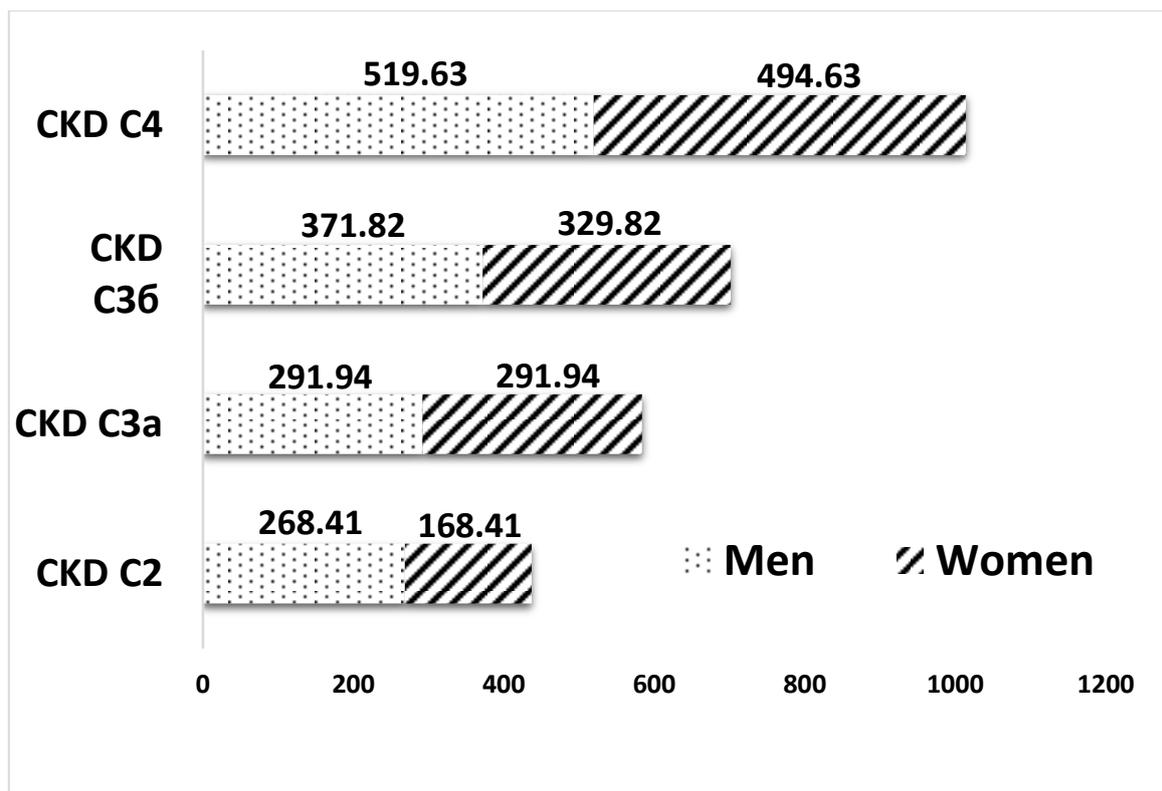
Figure: 1 . Average level of uric acid in patients with CUOD (μmol / l).

While examining patients with C4 stage CUOD was recorded the highest average levels of uric acid, as follows: 519 pmol / L in men and 454, 8 mol / l in women. The study found that as CUOD progresses, average uric acid levels increase.

In addition, a higher correlation was noted between the level of uric acid and albuminuria r = 0.7, p < 0.05. While separating patients due to the presence / absence of hypertension it was identified that the highest correlation between the level of uric acid and CUOD: r = 0.9, p < 0.01. In turn, in the group of patients with no arterial hypertension, this correlation is also traced, but less significant: r = 0.7, p < 0.05.

Then, the studied patients were separated into four groups according to the quartile of the primary concentration of uric acid; the estimated glomerular filtration rate (eGFR) was compared in all examined groups. A connection was established between the level of uric acid and systolic blood pressure (SBP) (Q1 - 110.9, Q2 - 110.1, Q3 - 112.8, Q4 - 116.1 mm Hg, respectively), as well as between concentration of uric acid and eGFR (P <0.01). In multivariate regression analysis, regulated for potential risk factors, including age, gender, body mass index, systolic blood pressure (SBP), and lipids, uric acid levels were noted to be a crucial factor influencing eGFR (β = -0.335, P <0.01). The outcomes of this research illustrated that raised serum uric acid levels are associated with lower estimated GFR.

Although, the figures for women and men with hyperuricemia varied evidently, which shows the necessity to pay attention to gender differences. The connection between the level of uric acid and the lipid spectrum in the blood in patients with asymptomatic hyperuricemia at different stages of CUOD has been established.

4. DISCUSSION

The estimation of the level of uric acid was implemented; the dependence of the level of hyperuricemia on the age of patients, the stage of the disease, the presence of arterial

hypertension were researched. The most important stage of hyperuricemia was found in patients with stage C4 of chronic uric organs disease. On that account, hyperuricemia can be used as an additional marker of the progression of chronic uric organs disease along with albuminuria.

Shiori Nagano et al . (2017) showed a connection between serum uric acid concentration with arterial stiffness and renal function in patients with normal blood pressure. It is known that raised serum uric acid levels correlate with an increased risk of not only gout, but also cardiovascular disease.

Nowadays, the most main role in the development of renal pathology is to the metabolic disorders common among residents of the civilized countries, like: diabetes mellitus type 2, obesity, hyperuricemia and hypertension, often exist in association with other similar signs, which is referred to as "metabolic syndrome".

Evidently, metabolic disorders, along with essential hypertension, are key determinants of the progressive deterioration of renal function in the general population. Significant common risk factors for CUOD and cardio vascular diseases, as well as the community of the key elements in the pathogenesis of diseases of the cardiovascular system and the resulting metabolic disorders renal lesions, among which a special role today withdrawn endothelial dysfunction, which handles, in particular, albuminuriya often reflects the high credibility of the significant possible complications. Taking into consideration these risk factors is crucial because the associated forms of kidney damage and CUOD are adjustable.

Simultaneously, kidney damage (active nephritis, nephrotic syndrome, renal failure) leads to severe disorders of various types of metabolism - purine, lipid, phosphorus-calcium. Through the direct toxic effect of metabolites on the renal structures and indirectly through disorders of renal hemodynamics, side effects of metabolic disorders in the kidneys are noticed. Metabolic disorders not only produce and accelerate the progress of nephrosclerosis, but also lead to cardiovascular complications, worsening the total prognosis.

Hyperuricemia occurs with a high frequency in patients with arterial hypertension (AH), diabetes, metabolic syndrome (MS), overweighing. There appears to be a genetic similarity between these disorders. In addition, a considerable role in the development of disorders of purine metabolism plays a widespread use of diuretics, primarily thiazides. There is a close relationship between hyperuricemia and CUOD: an increase in uric acid levels can be a consequence of decreased renal function, on the other hand, hyperuricemia can lead to chronic kidney disease (chronic interstitial nephritis, stone formation) and common hepatic duct (urate crisis).

An adverse effect of hyperuricemia on systemic blood pressure, renal hemodynamics, and endothelial state has been demonstrated. The damaging effect of elevated uric acid levels is apparently associated with the initiation of endothelial dysfunction and chronic systemic inflammation, slowing of oxidative metabolism, platelet adhesion, impaired blood rheology and aggregation [3, 12, 15].

Nowadays, epidemiological data on the role of hyperuricemia as a possible independent risk factor for cardiovascular complications and triphosphopyridine nucleotide (TPN) are insufficient. According to a number of studies, the concentration of uric acid in the blood serum significantly correlates with the severity of abdominal obesity and triglyceridemia , and in patients with hypertension and hyperuricemia , Arterial hypertension is more common [5 , 9].

It is important to emphasize that many factors associated with renal dysfunction are also traditional risk factors for cardiovascular diseases, such as arterial hypertension, diabetes mellitus, male sex, age, dyslipidemia, obesity, metabolic syndrome, and tobacco smoking.

These days the results of numerous studies indicate that the so-called non-traditional risk factors for the progression of cardiovascular diseases are most likely due to progressive renal dysfunction. These include oxidative stress, anemia [8] , chronic inflammation, hyperhomocysteinemia , increased synthesis of asymmetric dimethylarginine , activation of the renin- angiotensin - aldosterone system, stress, hyperuricemia , natriuretic factors, etc. (Esayan A.M., 2002, Mukhin et al. ., 2004, Smirnov et al ., 2005, Saito A. et al ., 2010). Among them, hyperuricemia plays an important role.

A significant correlation was found between the level of uric acid and albuminuria as a proven factor in the progression of CUOD: $p < 0.05$ ($p = 0.02$), $k = 0.8$.

Based on the results obtained , it is assumed that hyperuricemia will be used as an independent marker of CUOD progression in conjunction with albuminuria.

Thus, in CUOD, a rise within the level of uric acid was disclosed, that was a lot of important within the group of patients with stage C4. The strongest correlation between the amount of uric acid and therefore the age of patients was found in patients of middle and senior age teams. A stronger correlation was found between the extent of acid and therefore the stage of CUOD in the cluster of patients with blood vessel cardiovascular disease compared with the cluster of patients with blood pressure level.

The information on the presence of a strong correlation between the level of uric acid and albuminuria as a proven factor in the progression of CUOD suggest the possibility of using hyperuricemia as an independent marker of the progression of CUOD along with albuminuria.

Thus, it is reasonable to determine the concentration of uric acid in patients with advanced stages of CUOD due to the fact that hyperuricemia aggravates long-term regular use of diuretics in significant doses. Thus, the rate of formation of uric acid is a marker for the severity of systemic oxidative (free radical), tissue damage, and its high levels in the blood is a predictor of poor prognosis of the Life Span patients with CUOD. Therefore, it is necessary to determine the level of uric acid in patients with CUOD in order to determine the prognosis.

5. CONCLUSION

In multivariate relapse investigation, altering for potential chance variables counting age, sex, body mass record, SBP, and lipids, uric acid levels were found to be a critical figure in eGFR. The results of this research showed that raised serum uric acid levels were related with the next chance of kidney malfunction.

Conflict Of Interests And Contribution Of Authors

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