

Benefits of Dietary Therapy in Pediatric Urate Nephropathy

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Article History	Abstract
Received: 8 th May 2026 Accepted: 6 th June, 2026	This article presents a scientifically grounded analysis of the effectiveness of dietary therapy in children aged 3-6 years with urate nephropathy. Using a specially designed 7-day dietary program, laboratory, clinical, and biochemical parameters were monitored to evaluate the impact of nutritional intervention on urinary system function. The results were compared with international studies and confirmed the effectiveness of dietary therapy. The article helps strengthen the scientific basis for dietary management in pediatric nephrology.
Keywords: Dietary Therapy, Diet, Urate Nephropathy, Biochemical Parameters, Pediatrics, Urinary System.	

Urate nephropathy is a form of kidney injury in children caused by impaired purine metabolism and excessive accumulation of uric acid. Dietary management is regarded as one of the key components of treatment. Disorders associated with abnormal purine metabolism are becoming increasingly common among children worldwide. According to statistical data, the incidence of this condition is estimated at 12-16 cases per 100,000 children in European countries and up to 20-25 cases per 100,000 children in CIS countries. Urate nephropathy accounts for 4-6% of urinary system diseases in children and, if not detected in time, may progress to chronic kidney disease.

Urate nephropathy is based on impaired uric acid metabolism resulting from enzymatic defects that may be present from infancy. Uric acid (2,6,8-trihydroxypurine) is a metabolic end product of adenine and guanine, which are constituents of nucleic acids. These disorders may be associated with defects in glucose-6-phosphatase, complete or partial hypoxanthine-guanine phosphoribosyltransferase deficiency, and increased catalytic activity of phosphoribosyl pyrophosphate synthetase. Uric acid-related disorders include a number of conditions, such as nephrolithiasis, gout, spondylosis, ischemic disease, and arthritis. In healthy children aged 1 to 14 years, the concentration of uric acid in the blood ranges from 0.17 to 0.41 mmol/L. The concentration of uric acid in urine depends on several factors. After filtration in the renal glomeruli, it undergoes both reabsorption and secretion in the proximal tubules. Only 10% of

filtered uric acid is ultimately excreted in the final urine. For this reason, it is very important to develop a scientifically based dietary therapy adapted to local conditions.

Materials and methods. The study included 48 children aged 3-6 years diagnosed with urate nephropathy. Of these, 28 were boys (58.3%) and 20 were girls (41.7%). The patients were divided into groups according to disease periodicity, recurrence pattern, and symptom frequency, and their response to dietary treatment was assessed. The children's dietary intake was analyzed separately for each season and evaluated in accordance with sanitary and hygienic standards. The dietary regimen was individualized according to age, metabolic requirements, and disease severity.

The diet was designed with a restricted purine content and was based mainly on vegetables, fruits, oatmeal, cottage cheese, milk, eggs, and greens. Meat products were recommended only 2-3 times per week and exclusively in boiled form. Daily fluid intake was increased to 1.5-2.0 liters in order to alkalinize the urine and facilitate crystal excretion. Monitoring included routine urinalysis, urinary pH, the presence of crystalluria, blood biochemistry tests including cholesterol, creatinine, and uric acid, as well as changes in general clinical symptoms. In addition, parents' subjective assessments of the child's general condition, mood, sleep, and appetite were taken into account. Study findings were analyzed using the SPSS statistical software package, and significance was accepted at $p < 0.05$.

Results and discussion. Patients with urate nephropathy require continuous long-term follow-up. Special attention should be paid during the hot months of the

year, since daily urine output decreases during this period and dense urinary sediment may form. At such times, fluid intake should be increased by 1.5 to 2 times. Fluid consumption should correspond to 2 liters per 1.73 m² of body surface area.

Considering that urates dissolve better in an alkaline medium, patients are advised to consume more alkaline mineral waters, particularly low-mineral hydrocarbonate-magnesium waters such as Essentuki No. 20, Zheleznovodsk, Pyatigorsk, and Bereznovsk mineral waters. Consumption of juices made from local grape varieties may also contribute significantly to urinary alkalization. Watermelon is recommended as a natural means of enhancing diuresis. Fruits, fruit juices, and vegetables alkalize the urine and thereby increase urate solubility.

Analysis of the collected data showed that children were not consuming sufficient amounts of calcium, dairy products, meat products, or citrus fruits. In particular, during the spring and summer months, caloric and protein intake was 15–25%

below recommended levels. According to WHO data published in 2003, failure to meet the minimum physiological nutritional standards for children may lead to adverse metabolic consequences. As shown in the table below, laboratory indicators demonstrated consistent positive changes during dietary treatment.

Laboratory indicators

Indicator	Before dietary therapy	After 6 months	Change
Blood uric acid (mmol/L)	0,47	0,35	-25,5%
Urinary pH	5,3	6,2	+17%
Crystalluria	78%	29%	-62,8%
Arthralgia	55%	12%	-78%
Oliguria	48%	15%	-68,7%

These changes are consistent with findings reported in other scientific sources. For example, in a study by Saito T. and co-authors published in *Clinical and Experimental Nephrology* in 2020, urinary pH was maintained at around 6.3 during alkalization therapy, and crystalluria decreased by more than 60%. Similar results were observed in our study. After dietary therapy, clinical manifestations such as headache, insomnia, arthralgia, intestinal spasms, and acetonemic vomiting decreased markedly. These findings also support the results reported in *Pediatric Nephrology Journal (USA, 2019)*, which demonstrated the effectiveness of diet-based interventions in reducing symptomatic manifestations. Positive changes were also observed in biochemical parameters after dietary intervention, specifically:

- blood cholesterol decreased by 14%;
- ammoniogenesis and titratable acid balance improved;
- urinary calcium and sodium excretion returned to normal values.

Ostrovsky and colleagues (2021) reported that dietary treatment may reduce the risk of metabolic complications, preserve the microbiological balance of the urinary system, and slow infiltration in renal tissues. During our study, 92% of parents noted improvement in their children's general condition, mood, and digestive function. Our findings demonstrated the high effectiveness of dietary therapy in urate nephropathy. This approach is also supported by foreign studies.

Diet therapy may additionally be recommended as a preventive measure to reduce the risk of chronic renal insufficiency in children. In the study by Ostrovsky et al. (2021), maintaining urinary pH within the range of 6.0–6.5 was associated with reduced urate sediment formation and improved urinary tract function. Similar findings were observed in our study.

Furthermore, a study conducted in the United States at a national pediatric nephrology center (*Pediatr. Nephrol. J.*, 2019) found that diet-based therapeutic approaches reduced uric acid concentration by an average of 20–30%. In our study, this reduction reached 25.5%, confirming the effectiveness of the dietary regimen developed in accordance with local nutritional conditions. In a study by the Japanese researcher Saito and colleagues (*Clin. Exp. Nephrol.*, 2020), increased fluid intake, a fruit- and vegetable-rich diet, and treatment with alkaline waters reduced progression to chronic urate nephropathy by 40%. These data are fully consistent with our findings. In addition, our study showed that an individualized dietary approach adapted to the age and biological needs of children led to steady improvement in both laboratory and clinical parameters. This suggests that dietary therapy may be recommended not only as an adjunctive measure, but also as a principal therapeutic strategy.

Conclusions

- Dietary therapy is one of the main treatment methods for urate nephropathy.
- Individualized diets based on locally available foods showed high effectiveness in reducing clinical symptoms and normalizing laboratory parameters.
- When compared with foreign scientific sources, the findings of this study are generally consistent with international evidence.
- Further in-depth research on the role of dietary therapy in other types of nephropathy is warranted.

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