

DIAGNOSIS OF KIDNEY STONE DISEASE IN CHILDREN

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Abstract: Kidney stone disease in children has become increasingly common in recent years and is considered an important problem in the fields of pediatrics and nephrology. The low expression of clinical symptoms in the early stages of the disease complicates diagnosis and may lead to the development of severe complications in cases detected late. This scientific article analyzes the effectiveness of modern diagnostic methods used to detect kidney stone disease in children. During the study, the diagnostic significance of laboratory and instrumental examinations was evaluated. The obtained results showed that ultrasonography is the main screening method in children, while computed tomography has high diagnostic accuracy in complicated cases.

Keywords: children, kidney stone disease, urolithiasis, diagnosis, ultrasonography, computed tomography.

Introduction

Kidney stone disease (urolithiasis) is one of the most common pathologies among diseases of the urinary system, and in recent years its incidence among children and adolescents has been increasing. According to the World Health Organization, the prevalence of urolithiasis in children is closely associated with environmental factors, improper nutrition, insufficient fluid intake, and hereditary predisposition.

In children, kidney stone disease often has a latent course or manifests with nonspecific clinical symptoms. Signs such as abdominal or lumbar pain, changes in urine color, and frequent urination may be confused with other diseases. Therefore, the use of modern diagnostic methods is essential for timely detection of the disease.

Failure to diagnose kidney stone disease at an early stage may lead to hydronephrosis, chronic pyelonephritis, and decreased renal function. For this reason, developing a comprehensive approach to diagnosing this disease in children remains a relevant issue.

The aim of this scientific work is to analyze laboratory and instrumental diagnostic methods used to detect kidney stone disease in children and to evaluate their effectiveness.

Clinical, Laboratory, and Instrumental Examination Methods

This work was carried out between 2023 and 2025 on the basis of pediatric and nephrology departments. Sixty children aged between 5 and 17 years who applied to medical institutions with suspected kidney stone disease were examined. Written informed consent was obtained from the parents of all children.

During the clinical examination, the general condition of the patients was assessed, and their main complaints and medical history were studied. Laboratory examinations included general urinalysis as well as biochemical blood parameters, including calcium, phosphorus, and uric acid levels.

As instrumental examination methods, ultrasonographic examination of the kidneys and urinary tract was performed in all patients. Ultrasonography was used as the primary screening method for detecting kidney stones. In cases where ultrasonography did not provide sufficient information or in complicated clinical situations, computed tomography was performed to уточнить the diagnosis.

The obtained clinical, laboratory, and instrumental data were processed using statistical analysis methods, and the results were expressed as percentage values.

Table 1. Diagnostic methods used in the detection of kidney stone disease in children

Diagnostic method	Frequency of use (%)	Diagnostic value
Ultrasonography (US)	100%	High
General urinalysis	100%	Moderate
Biochemical blood analysis	85%	Moderate
Computed tomography (CT)	40%	Very high

Table 2. Distribution of kidney stones according to size

Stone size	Number of patients	Percentage (%)
Up to 3 mm (microliths)	15	25%
3–5 mm	24	40%
Larger than 5 mm	6	10%
No stones detected	15	25%

Results

According to the results, kidney stones were detected by ultrasonographic examination in 65% of the examined children. Microliths up to 3 mm were detected in

25% of patients, stones measuring 3–5 mm in 40%, and stones larger than 5 mm in 10% of cases. In 25% of cases, no kidney stones were detected.

Urinalysis revealed signs of microhematuria and crystalluria in the majority of patients. Biochemical blood tests predominantly showed disorders of calcium metabolism. Computed tomography demonstrated high diagnostic accuracy in cases where stones were not clearly visualized by ultrasonography.

The obtained results indicate that ultrasonographic examination is the main screening method for detecting kidney stone disease in children due to its safety and convenience. This method is radiation-free and completely safe for children. However, in some cases, depending on the small size or localization of stones, ultrasonography may not provide sufficient information.

In such situations, computed tomography is recommended as an additional method with high diagnostic accuracy. At the same time, identification of metabolic disorders through laboratory tests plays an important role in determining the etiology of the disease and preventing recurrence in the future.

Conclusion

Early detection of kidney stone disease in children requires a comprehensive diagnostic approach. Ultrasonography is the primary examination method and should be supplemented with laboratory tests and, when necessary, computed tomography. Timely and accurate diagnosis helps prevent the development of severe complications in children.

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