



ANALYSIS OF APPEALS AND CHARACTERISTICS OF URINARY TRACT ANOMALIES SYMPTOMS IN CHILDREN

Authors:

- Ahmedov Yu.M. Orcid 0000-0001-6893-3737
- Ahmedov I.Yu. Orcid 0000-0001-5943-8208
- Muxsinov S.O'. Orcid 0009-0009-4903-8599

Samarkand State Medical University. Samarkand, Uzbekistan

Abstract. Megaureter is a disease of the urinary system. According to UN data, anomalies of the urinary system organs in children occupy one of the leading positions among all pathologies. Various authors report that megaureter accounts for up to 40% of diseases in this group. Disruption of urodynamic indicators results in persistent obstructive pyelonephritis in 23-27% of cases in children, which in turn can lead to chronic renal failure. Megaureter is one of the most urgent problems in pediatric practice as it leads to kidney complications. Clinical manifestations of megaureter in children can vary but are often characterized by specific clinical symptomatology. According to the analysis, when children with megaureter were admitted, the majority of patients complained of changes in urine tests and an increase in body temperature. Their urine analyses and ultrasound results play a crucial role in diagnostics and treatment. In most patients with megaureter, various degrees of urinary syndrome manifested as leukocyturia and, less frequently, proteinuria were identified. As evidenced by the table, there was no significant difference in clinical-laboratory changes during the remission of the inflammatory process associated with anomalies in the development of the urinary system. Based on the above information, a developed program is used in the diagnostics and treatment of megaureter in children (officially registered by the Intellectual Property Agency of the Republic of Uzbekistan, Program № 09273, "Program for Determining Indications for Surgical Treatment of Megaureter in Children").

Keywords: children, megaureter, obstructive uropathy, reflux.

АНАЛИЗ ОБРАЩЕНИЙ И ОСОБЕННОСТИ СИМПТОМОВ АНОМАЛИЙ МОЧЕВЫХ ПУТЕЙ У ДЕТЕЙ

Аннотация. Мегауретер – это заболевание мочевыделительной системы. По данным ООН, аномалии органов мочевыделительной системы у детей занимают одну из ведущих позиций среди всех патологий. По данным различных авторов, мегауретер составляет до 40% заболеваний в этой группе. Нарушение уродинамических показателей приводит к

стойкому обструктивному пиелонефриту в 23-27% случаев у детей, что, в свою очередь, может привести к хронической почечной недостаточности. Мегауретер является одной из наиболее актуальных проблем в педиатрической практике, поскольку ведет к почечным осложнениям.

Клинические проявления мегауретера у детей могут варьироваться, но часто характеризуются специфической клинической симптоматикой. По данным анализа, при поступлении детей с мегауретером большинство пациентов жаловались на изменения в анализах мочи и повышение температуры тела. Их анализы мочи и результаты ультразвукового исследования играют ключевую роль в диагностике и лечении. У большинства пациентов с мегауретером выявлены различные степени мочевого синдрома, проявляющиеся лейкоцитурией и, реже, протеинурией. Как показано в таблице, не было значимых различий в клинико-лабораторных изменениях в период ремиссии воспалительного процесса, связанного с аномалиями развития мочевыделительной системы. На основании вышеизложенной информации разработана программа, используемая в диагностике и лечении мегауретера у детей (официально зарегистрированная Агентством интеллектуальной собственности Республики Узбекистан, программа № 09273, "Программа определения показаний для хирургического лечения мегауретера у детей").

Ключевые слова: дети, мегауретер, обструктивная уропатия, рефлюкс.

Introduction: Megaureter is a disease of the urinary system. According to UN data, anomalies of the urinary system organs in children occupy one of the leading positions among all pathologies. Various authors report that megaureter accounts for up to 40% of diseases in this group. Disruption of urodynamic indicators results in persistent obstructive pyelonephritis in 23-27% of cases in children, which in turn can lead to chronic renal failure. Megaureter is one of the most pressing problems in pediatric practice leading to kidney complications [1,2,3,4,5]. This is connected with the following factors:

- Disruption of the urinary tract does not ensure normal evacuation of urine, creating conditions for the development of microbial flora, which can cause kidney inflammation.

- High hydrostatic pressure in the kidney pathologically affects renal blood flow [2,6].

Megaureter requires surgical intervention if accompanied by persistent recurrent pyelonephritis, urinary obstruction, or a sharp decrease in kidney function. The main goal of surgery is to normalize urodynamics, which is an integral part of complex treatment and is crucial for preventing complications of congenital megaureter. The choice of surgical method and technique depends on the clinical manifestations of the disease, the presence of complications, and the patient's general condition. Proper diagnostics and timely referral to the appropriate specialist are also important, as this facilitates the early initiation of diagnostic measures and decision-making regarding conservative or surgical treatment.

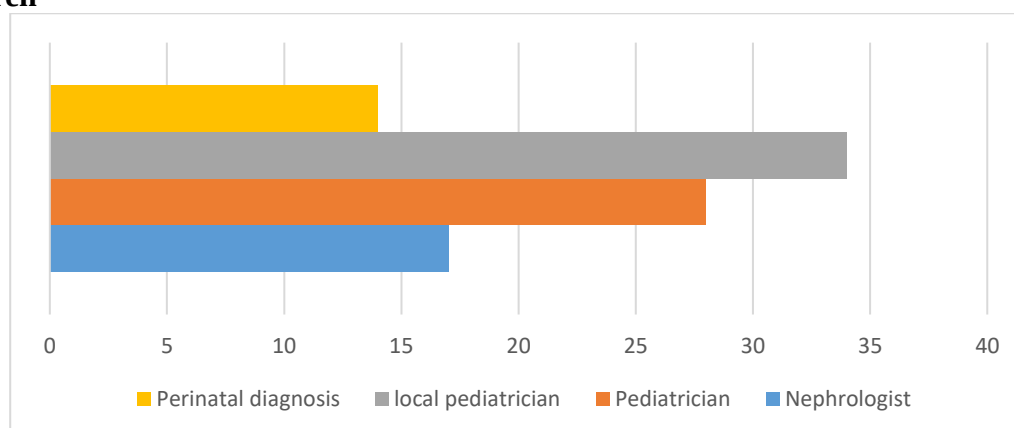
Purpose: To analyze the symptoms of megaureter in children and the degree of their recurrence [7,8,9,10].

Materials and Methods: The study presents the appeals, diagnostics, and treatment results of 116 patients with reflux and obstructive megaureter who were treated at the 2nd Department of Pediatric Surgery of Samarkand State Medical University from 2010 to 2024.

Results: Clinical manifestations of megaureter in children can vary but are often characterized by specific clinical symptomatology. In the process of studying medical records, an analysis was conducted of the reasons why parents brought their children to the doctor for diagnostics and treatment of megaureter pathology, as reflected in Figure 1.

Table 1.

Analysis of Patients' First Consultations in the Appearance of Megaureter Symptoms in Children



According to the presented data, the first appeal of parents regarding the symptoms of the disease most often corresponds to specialists at the primary level of healthcare—general practitioners at family polyclinics and rural medical stations—accounting for 34 cases (27.6%). Additionally, parents of sick children frequently consulted pediatricians at central district hospitals and multidisciplinary medical centers, totaling 28 cases (22.7%). Our study observed a recent increase in the number of prenatal diagnostics, which amounted to 14 cases (11.3%). A smaller percentage comprised patients treated in nephrology departments who were referred to surgical departments by nephrologists—17 cases (13.8%).

Depending on the stage of the disease, complaints may include lethargy, rapid fatigue, elevated body temperature, and vague pains in the abdominal and lumbar regions. In the majority of children, the disease had a latent course and manifested with transient leukocyturia; dysuric phenomena were observed in rare cases. Abnormalities in urinalysis were first detected after intercurrent illnesses or during routine medical examinations. Ultrasonographic examination results showed enlargement of the kidneys and urinary tract.

Some patients were treated for an extended period in outpatient settings under the supervision of a district physician or in pediatric departments for "urinary tract infections." However, antibacterial therapy had only a temporary effect, and symptoms reappeared after discontinuation. This led to consultations with pediatric surgeons/urologists and the need for additional examinations. In 42 children, the disease had an acute onset, presenting with a picture of acute pyelonephritis, elevated body temperature, signs of intoxication, dysuria, and significant negative changes in urinalysis.

Analyzing the clinical course of the disease showed that in children under one year of age, the absence of prenatal diagnostics could result in a latent course of the disease. Late diagnosis indicates that parents and primary care physicians lack sufficient awareness of the signs of this disease and exhibit low vigilance.

The analysis underscores the importance of early detection and awareness of megaureter symptoms in children. Enhancing education among parents and primary healthcare providers about the subtle signs of urinary tract anomalies can lead to timely referrals and interventions, potentially preventing serious complications like chronic renal failure.

Table 2.

The frequency of clinical signs of megaureter

Symptoms	Obstructive n=63	Type	Refluxing n=39	Type	Comparison n=21	Group	Total
Elevated Body Temperature	43 (68.2%)		26 (66.7%)		19 (90.4%)		88
Abdominal Pain	11 (17.4%)		6 (15.3%)		5 (23.8%)		22
Back Pain	10 (15.8%)		10 (25.6%)		8 (38.1%)		26

Symptoms	Obstructive Type n=63	Refluxing Type n=39	Comparison Group n=21	Total
Dysuric Symptoms	14 (22.2%)	6 (15.4%)	1 (4.7%)	21
Changes in Urinalysis	55 (87.3%)	36 (92.3%)	21 (100%)	112
Acute Urinary Retention	2 (3.1%)	2 (5.1%)	0 (0%)	4

This table illustrates the distribution of symptoms among pediatric patients with different types of megaureter. Here's a detailed analysis:

Elevated Body Temperature was a common symptom across all groups, especially prominent in the comparison group with 90.4% of patients exhibiting fever. This suggests that systemic signs of infection are prevalent in megaureter cases. Abdominal Pain was reported by a smaller percentage of patients, with the highest occurrence in the comparison group (23.8%). This may be due to the nonspecific nature of abdominal discomfort in children, which can be easily overlooked or attributed to other causes. Back Pain was more frequent in the comparison group (38.1%) compared to the obstructive (15.8%) and refluxing types (25.6%). Back pain can indicate upper urinary tract involvement and should prompt thorough evaluation. Dysuric Symptoms such as difficulty or pain during urination were most common in the obstructive type (22.2%). This aligns with the expected clinical presentation, where obstruction leads to urinary flow issues. Changes in Urinalysis were the most prevalent finding, observed in virtually all patients—100% in the comparison group. Abnormal urinalysis results, including leukocyturia and proteinuria, are critical indicators of urinary tract pathology. Acute Urinary Retention was relatively rare but noteworthy, occurring in a small fraction of patients in both the obstructive (3.1%) and refluxing types (5.1%). This acute condition requires immediate medical attention.

Insights and Implications: The data highlights several important considerations in the diagnosis and management of megaureter in children:

High Prevalence of Urinalysis Changes: The universal occurrence of urinalysis alterations underscores the importance of routine urine screenings. Regular monitoring can facilitate early detection of urinary tract anomalies, even before clinical symptoms become severe.

Systemic Symptoms: The frequent presentation of elevated body temperature indicates that infection is a common complication. Healthcare providers should maintain a high index of suspicion for urinary tract infections in pediatric patients presenting with fever of unknown origin.

Variability of Symptoms: The diverse symptomatology reflects the complexity of megaureter presentations. Symptoms like abdominal and back pain, while less common, are significant and warrant further investigation when they occur.

Importance of Prenatal Diagnostics: The higher symptom rates in the comparison group suggest that prenatal diagnostics can significantly influence early detection. Enhancing prenatal screening programs could lead to better outcomes by allowing for timely interventions.

Parental and Primary Care Awareness: The latent course of the disease in many cases indicates a need for increased awareness among parents and primary care physicians. Education on the subtle signs of urinary tract disorders can lead to earlier consultations and referrals.

Moving Forward: To improve the prognosis for children with megaureter, it is crucial to:

Develop Standardized Screening Protocols: Implementing routine urinalysis and ultrasound examinations in pediatric check-ups can aid in early detection.

Enhance Training for Primary Care Providers: Equipping family doctors and pediatricians with the knowledge to recognize early signs of megaureter will facilitate prompt referrals to specialists.

Promote Parental Education: Informing parents about potential symptoms and the importance of early medical evaluation can lead to quicker diagnosis and treatment.

Invest in Prenatal Screening: Expanding access to prenatal ultrasonography can identify urinary tract anomalies before birth, allowing for immediate postnatal management strategies.

By prioritizing these steps, the medical community can work towards reducing the incidence of complications associated with megaureter in children. Early intervention not only improves individual patient outcomes but also has the potential to decrease the long-term burden on healthcare systems.

Table 3.

Laboratory Indicators of Patients with Megaureter

Parameter	Obstructive Type (n=)	Refluxing Type (n=)	Comparison Group (n=)
Leukocyturia (per field of view)	22.0 ± 1.28*	19.3 ± 1.49*	25.0 ± 0.97*
Proteinuria (g/day)	0.17 ± 0.09	0.05 ± 0.01	0.19 ± 0.09
Blood Uric Acid (μmol/L)	6.93 ± 1.03*	6.65 ± 0.69*	7.10 ± 0.77*
Blood Creatinine (μmol/L)	102.1 ± 1.47*	98.1 ± 0.83*	99.1 ± 0.83*

Explanation:

This table summarizes key laboratory parameters observed in children diagnosed with megaureter, comparing the obstructive and refluxing types to a control (comparison) group.

Leukocyturia (per field of view): Indicates the number of white blood cells present in the urine, a marker of inflammation or infection in the urinary tract.

Findings: All groups show elevated leukocyturia, with the comparison group exhibiting the highest average value of 25.0 ± 0.97.

Proteinuria (g/day): Measures the amount of protein excreted in the urine over 24 hours, reflecting kidney filtration efficiency.

Findings: Proteinuria is present in all groups, but it is highest in the comparison group (0.19 ± 0.09 g/day) and lowest in the refluxing type (0.05 ± 0.01 g/day).

Blood Uric Acid (μmol/L): High levels can indicate decreased kidney function or increased cell turnover.

Findings: Levels are slightly elevated across all groups, with the comparison group showing the highest average (7.10 ± 0.77 μmol/L).

Blood Creatinine (μmol/L): A key indicator of kidney function; elevated levels may suggest impaired renal filtration.

Findings: The obstructive type group has the highest creatinine levels (102.1 ± 1.47 μmol/L), hinting at possible kidney function compromise due to obstruction.

Insights: The elevated leukocyturia across all groups underscores the prevalence of urinary tract inflammation in children with megaureter. This finding is crucial for diagnosing and monitoring infection.

The presence of proteinuria, especially in the obstructive and comparison groups, may indicate glomerular involvement and necessitates careful nephrological evaluation.

Slight variations in blood uric acid levels suggest that while there is some impact on metabolic functions, it may not be the primary concern compared to other parameters.

Increased blood creatinine in the obstructive group highlights the potential for renal impairment caused by urinary flow obstruction. Early detection and intervention are essential to prevent long-term kidney damage.

Additional Thoughts: Understanding these laboratory results is vital for tailoring treatment plans for children with megaureter. Regular monitoring allows healthcare providers to assess the progression of the disease and the effectiveness of interventions.

Moving Forward:

Early Intervention: Prompt surgical or medical management can alleviate obstruction or reflux, preserving renal function.

Multidisciplinary Approach: Collaboration between pediatricians, nephrologists, and urologists ensures comprehensive care.

Parental Education: Informing parents about the significance of symptoms like changes in urination patterns or recurrent infections can lead to earlier diagnosis.

Advancements in diagnostic imaging, such as functional MRI and nuclear scintigraphy, offer detailed insights into kidney function and can aid in the assessment of megaureter severity without invasive procedures.

From the data presented in Table 3, it is evident that during the remission phase of the inflammatory process associated with anomalies in the development of the urinary system, no significant differences were found in clinical-laboratory changes. The periodic exacerbation of the inflammatory process, on one hand, prompted children to seek medical attention, and on the other hand, indicated the progression of the pathological process and its transition into a more complex form.

Based on the information outlined above, a specialized program has been developed and is being utilized for the diagnosis and treatment of megaureter in children. This program is officially registered with the Intellectual Property Agency of the Republic of Uzbekistan (Program No. 09273, "Program for Determining Indications for Surgical Treatment of Megaureter in Children").

Insights and Implications: Megaureter, characterized by the dilation of the ureter, presents a unique challenge in pediatric urology. The absence of significant clinical-laboratory differences during remission suggests that standard diagnostic markers may not always reflect the underlying pathology. This silent progression emphasizes the importance of continuous monitoring and comprehensive diagnostic approaches.

The periodic intensification of the inflammatory process serves as a critical indicator. On one side, it leads to increased medical consultations as children exhibit acute symptoms. On the other, it reflects the advancing nature of the disease, potentially transitioning into more severe or complex forms. This dual impact highlights the need for proactive management strategies.

The implementation of the specialized program signifies a significant advancement in addressing megaureter in children. By standardizing the criteria for surgical intervention, it aims to optimize patient outcomes and prevent unnecessary procedures. The program likely incorporates the latest research, clinical guidelines, and best practices tailored to the pediatric population.

Moving Forward: Understanding that megaureter can progress without pronounced laboratory changes calls for heightened vigilance among healthcare providers. Regular ultrasound evaluations, along with careful assessment of urinary symptoms, become essential tools in early detection.

Moreover, educating parents about potential signs—such as changes in urination patterns, unexplained fevers, or abdominal discomfort—can facilitate prompt medical attention. The metaphor of an iceberg is fitting here: the visible symptoms are just the tip, while a significant portion of the disease's impact lies unseen beneath the surface.

Advancements in minimally invasive surgical techniques have revolutionized the treatment of urinary tract anomalies in children. Procedures such as laparoscopic ureteral reimplantation offer reduced recovery times and minimized scarring, improving the overall patient experience.

Conclusion: The journey towards effectively managing megaureter in children is multifaceted. It requires a combination of vigilant monitoring, timely intervention, and the use of innovative

programs like the one registered in Uzbekistan. By embracing a comprehensive approach, healthcare professionals can significantly improve outcomes and quality of life for affected children.

SURGICAL TREATMENT DETERMINATION PROGRAM

Symptom/Indication	Obstructive Type	Refluxing Type	Comparison Group
Pain Syndrome			
- Accompanied by Hematuria	✓	✓	
- Accompanied by Elevated Body Temperature	✓	✓	
- Accompanied by Dysuria	✓		
- Accompanied by Renal Colic	✓		
Urinary Syndrome			
- Leukocytes	✓	✓	
- Leukocytes + Protein	✓		
- Leukocytes + Protein + Blood	✓		
Dysuric Phenomena			
- Once	✓	✓	
- Recurrent	✓	✓	
- Multiple Times	✓		
Enlargement of Urinary Tract			
- Grade I	✓	✓	
- Grade II	✓	✓	
- Grade III	✓	✓	
Chronic Obstructive Pyelonephritis			
- Exacerbation Stage	✓	✓	
- Remission Stage	✓	✓	

This table outlines the criteria used to determine indications for surgical treatment in patients with obstructive and refluxing types of megaureter. The presence of specific symptoms and laboratory findings helps clinicians decide when surgical intervention is necessary.

Key Insights:

Pain Syndrome: Both types commonly present with pain accompanied by hematuria and elevated body temperature. However, dysuria and renal colic are more specific to the obstructive type.

Urinary Syndrome: Leukocyturia is observed in both types, indicating inflammation or infection. The combination of leukocytes with protein, and with protein plus blood, is exclusive to the obstructive type, suggesting more severe urinary abnormalities.

Dysuric Phenomena: Occasional and recurrent dysuric symptoms are seen in both types, but frequent occurrences are noted only in the obstructive type.

Enlargement of Urinary Tract: All grades (I to III) of urinary tract dilation are present in both types, reflecting varying severity levels.

Chronic Obstructive Pyelonephritis: Both types can experience this condition in both exacerbation and remission stages, emphasizing the need for careful monitoring and management.

Program Schema:

Determining Indications for Surgical Treatment in Children (Figure 1) encompasses objective and subjective signs, as well as instrumental data. This comprehensive approach allows healthcare professionals to select the most optimal method for diagnosis and subsequent treatment tactics.

Conclusion: Analyzing the material above, we can conclude that increasing the awareness among primary care specialists, pediatricians, and nephrologists leads to more frequent early detection of the disease. Consequently, this results in a higher number of positive treatment outcomes for patients with megaureter.

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