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Urinary Tract Infection with Obstructional Pyelonephritis in Children

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Abstract: In this article, the author provides an analysis of the results of surgical treatment of urinary tract pathologies in children affected by pyelonephritis. A qualitative analysis of the microbial landscape of pathogens causing urinary tract infections in children is carried out.

Keywords: Children, urinary tract infection, obstructive pyelonephritis, etiology.

Relevance. Despite the successes of modern medicine in the field of surgical treatment of congenital obstruction of the urinary tract at various levels, there is an increase in the number of children with unsatisfactory results of their treatment, which returns the interest of urological clinicians to the problem of obstructive pyelonephritis (OP) [1,4]. It is noted that when urodynamics are disturbed , favorable conditions are created for the persistence of microbial flora in the urinary tract, and, accordingly, to increase further pathogenic effects, including colonization, penetration , reproduction, invasion and production of toxic substances [2,3,5]. The results of research in the scientific literature in recent years show that many researchers associate failures in the diagnosis and treatment of complicated urinary tract infections (UTIs) with the presence of biofilms, when microbial cells are attached to the surface or to each other, enclosed in a matrix of extracellular polymeric substances synthesized by them, and demonstrate a transformation of the phenotype, which is expressed in changes in growth parameters and the expression of specific genes [7,12, 15]. Particular difficulties arise due to the fact that during modern high-tech urological examination and treatment, the child is subjected to mandatory invasive interventions - bladder catheterization, cystoureteroscopy , temporary urine diversion, ureteral stenting , etc., when the risk of ascending infection increases sharply [6, 8,10,16].

In addition, the empirical prescription of antibiotics in the initial stages of the disease, when the cause of the temperature reaction is not diagnosed in primary health care, as well as before receiving the results of the tank. Urine culture by doctors in clinics and hospitals helps to increase the tolerance of microorganisms to antibiotics [4,6,13].

Obstructive uropathy ranks first in frequency and significance among the factors predisposing to pyelonephritis [3,9,11]. for the urinogenic route of infection to occur, the presence of an infectious agent in the bladder or in the renal collecting system is necessary [8]. Minimally invasive diagnostic and therapeutic procedures, which have been widely introduced in recent years in pediatric urological practice, pose a particular threat [15]. The phenomenon of bacterial adhesion plays an important role in the urinogenic route of infection, i.e. the ability of certain microorganisms to fixate (stick) to the receptors of the epithelium of the mucous membrane of the urinary tract with the help of special organelles - fimbriae (pili) and move along it against the natural flow of urine, releasing endotoxin, counteracting opsonization and phagocytosis [9]. Therefore, to this day, issues of diagnosis, monitoring and prognosis of the course of UTI in children remain a serious problem in pediatric urology [6,14].

Purpose of the study. Analysis of the spectrum of pathogenic bacterial flora found in the urine of sick children with congenital obstructive uropathy .

Material and methods. We analyzed the results of treatment and examination of 174 sick children with various pathologies of the urinary tract with obstructive uropathy , aged from 1 month to 14 years, who were hospitalized in the department of pediatric surgery and urology of the Bukhara Regional Multidisciplinary Children's Medical Center (BOMDC), which is the clinical base of the Department of Pediatric Surgery of the Bukhara State Medical Institute for the period 2019 - 2022.

Of all those examined, 91 (52.3%) were boys, 83 (47.7%) were girls. When analyzing the data obtained on nosology, the following was revealed: congenital hydronephrosis was detected in 64 patients (36.8%), ureterohydronephrosis was detected in 28 patients (16.1%), vesicoureteral reflux was diagnosed in 66 sick children (37.9) . PMR) and in 16 sick children (9.2%) with bladder outlet obstruction (IVO) - strictures and valves of the posterior urethra. When analyzing patients depending on age, various forms of urinary tract obstruction were most often diagnosed in 83 cases (47.7%) in children under 1 year of age, in 59 cases (33.9%) in children from 1 to 4 years of age. x years, in the remaining 42 cases (18.4%) this pathology was diagnosed in older children.

Diagnosis of various forms of urinary tract obstruction in children was made on the basis of standard x-ray urological examination (excretory urography and voiding cystoureterography) and ultrasound with Dopplerography. If necessary, nephroscintigraphy was additionally performed for the purpose of dynamic assessment of renal excretory function.

Microbiological diagnosis of urinary tract infection was carried out on the basis of the microbiological laboratory of the Regional Clinical Medical Center. For microbiological examination, we used urine obtained both during natural urination and during catheterization of the bladder, swabs from endoscopic equipment and biopsy samples . pyeloureteral , ureterovesical and ureteral segments taken intraoperatively . Isolation and identification of bacterial flora was carried out in accordance with research methods used in clinical diagnostic laboratories and medical institutions. For the study, an average portion of the first morning urine in a volume of 50-100 ml was collected in a sterile tightly closed container. Samples for research were delivered to the laboratory within 2 hours. The work used quantitative methods for bacteriological examination of urine: the calibrated loop method and the method of inoculating a certain volume of the sample. Bacteriological examination of swabs from endoscopic equipment and biopsies was carried out as follows: sterile material collected during surgery or swabs from an endoscope after manipulation were placed in sterile bottles with broth and delivered to the laboratory for examination within 2 hours. In the laboratory, cultures on solid nutrient media were carried out on the day of delivery. The next day, the grown colonies were counted and inoculated onto solid nutrient media from the broth.

Results. Analysis of the results of bacteriological examination of urine in 174 children with various forms of urinary tract obstruction in children showed that the pathogen was isolated in most cases (Table 1). At the same time, microorganisms in the urine were detected in 155 (89.1%) cases, microorganisms were not isolated in 19 (10.9%) cases. Our data show that the dominant pathogen in children was *Escherichia coli* , which was detected in 72 (41.4%) cases. *Enterococcus* took second place in the structure of UTI pathogens in children. *faecalis* – 21 (12.1%) cases.

Less frequently detected from the urine of patients: *Proteus mirabilis , Klebsiella spp ., Klebsiella pneumoniae , Pseudomonas cepacia* . In isolated cases the following were identified: *Enterococcus faecium , Pseudomonas aueruginosa , Streptococcus agalactiae , Staphylococcus - Streptococcus agalactiae , Staphylococ - agalactiae , Staphylococ-agalactiae , Staphylococ -, Staphylococ - Staphylococ-cus epidermidis , Staphylococcus aureus* . It should be noted that

there is a dependence of the frequency of isolation of the microorganism on the level and degree of obstruction of the urinary tract (Table 1).

Table No. 1. Frequency of detection of potentially pathogenic microorganisms in urine

Type of microorganism	Patients examined *(174)*	
	Quantity (abs .)	*Quantity (%)*
Escherichia coli	*72*	41.4
Enterococcus faecalis	21	12.1
Enterococcus faecium	3	1.7
Proteus mirabilis	4	2.3
Klebsiella spp .	8	4.6
Klebsiella pneumoniae	6	3.4
Pseudomonas aueruginosa	5	2.9
Staphylococcus epidermidis	8	4.6
Staphylococcus aureus	eleven	6.3
Association of microorganisms	17	9.8
Microorganisms not isolated	19	10.9

When analyzing the sensitivity of microorganisms to antibacterial drugs approved for use in pediatric practice, it was shown that in the empirical treatment of urinary tract infections, the drugs of choice may be 3-4 generation cephalosporins and aminoglycosides, which have shown fairly high activity against the main causative agent of UTI in children - *E coli* _ _ In cases of severe inflammation in the urinary tract, the use of carbapenems is justified , which have shown high activity against all pathogens of urinary tract infections, with the exception of *Pseudomonas aueruginosa* .

UTI pathogens in children are most sensitive to 3-4 generation cephalosporins, carbapenems and fluoroquinolones . However, in pediatric practice, the use of fluoroquinolones is possible in exceptional cases, despite their high potential for action on a group of gram-negative microorganisms (gram-negative cocci, enterobacteria, pseudomonas, campylobacter), since these drugs have an age limit for use of up to 14 years.

Conclusion. Thus, based on the results obtained, it should be concluded that in most cases (89.1%) it was possible to detect and identify microorganisms in the urine of children with congenital urinary tract obstruction. When the clinical picture of UTI manifested itself (acute phase), the frequency of pathogen isolation was higher than in the absence of clinical manifestations of UTI (latent phase).

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