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MODERN DIAGNOSTIC CRITERIA FOR THE EVALUATION OF CYSTITIS

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Abstract. Cystitis is one of the most common inflammatory diseases of the urinary tract, particularly among women of working age. Timely and accurate diagnosis is crucial for selecting an effective treatment strategy and preventing complications. This article reviews modern diagnostic criteria for cystitis based on clinical presentation and the findings of laboratory and instrumental investigations. Special attention is given to the role of urinalysis, bacteriological examination, determination of pathogen susceptibility to antibacterial agents, as well as the use of ultrasound and endoscopic methods. The application of a comprehensive diagnostic approach improves diagnostic accuracy, shortens treatment duration, and helps prevent chronic progression of the inflammatory process.

Keywords: cystitis, urinary tract infection, diagnostic criteria, urinalysis, bacteriological culture, antimicrobial susceptibility testing, ultrasound examination, cystoscopy, differential diagnosis

Relevance. Cystitis is one of the most common inflammatory diseases of the urinary tract and represents a significant medical and social problem in modern medicine. According to clinical observations, the disease is more frequently diagnosed in women of reproductive age, which is обусловлено anatomical and physiological features of the urogenital system, hormonal changes, and lifestyle-related factors. The high prevalence of cystitis, its tendency to recur and progress to a chronic form lead to a decrease in patients' quality of life and an increased burden on the healthcare system [9,14,15].

Modern conditions are characterized by a growing antibiotic resistance of uropathogens, which significantly complicates treatment and requires a more accurate and evidence-based diagnostic approach. Incomplete or delayed diagnosis of cystitis may result in the development of complications, including ascending infection, pyelonephritis, interstitial cystitis, and functional disorders of the urinary bladder. In this regard, the use of modern diagnostic criteria becomes particularly important, as they allow not only confirmation of the inflammatory process but also determination of its etiology, severity, and risk of chronicity [6,7,10].

Currently, the diagnosis of cystitis is based on a comprehensive assessment of clinical symptoms and the results of laboratory and instrumental investigations. Urinalysis, bacteriological examination with determination of antimicrobial susceptibility, as well as the use of ultrasound and endoscopic methods, significantly improve diagnostic accuracy. The implementation of modern diagnostic approaches contributes to rational therapy selection, reduction of recurrence rates, and prevention of complications. Thus, the study and application of modern diagnostic criteria for cystitis is a relevant area of clinical practice aimed at improving diagnostic efficiency, optimizing treatment strategies, and enhancing disease outcomes in patients of various age groups [7,15].

Cystitis is an inflammatory disease of the urinary bladder mucosa, most often of infectious origin. The most common etiological factor is bacterial flora, predominantly *Escherichia coli*; however, other microorganisms, including *Klebsiella* spp., *Proteus*

spp., *Enterococcus* spp., and staphylococci, may also be involved in the development of the disease. In some cases, cystitis may be caused by viruses or fungi or have a non-infectious origin, which should be taken into account during diagnostic evaluation [2].

Modern diagnostic criteria for cystitis are based on a combination of clinical, laboratory, and instrumental data. The main clinical manifestations include frequent and painful urination, dysuria, a sensation of incomplete bladder emptying, suprapubic pain, and changes in urine characteristics. However, clinical symptoms may vary depending on the form of the disease, patient age, and the presence of comorbidities, which necessitates laboratory confirmation of the diagnosis [7,14,15].

Laboratory examination of urine plays a leading role in the diagnosis of cystitis. Routine urinalysis allows detection of leukocyturia, bacteriuria, hematuria, and changes in the physical properties of urine. Bacteriological urine culture with determination of pathogen sensitivity to antibacterial drugs is considered the “gold standard” of diagnosis, especially in recurrent and complicated cases. This method enables rational selection of antibacterial therapy and reduces the risk of antibiotic resistance development [3,8,11].

Instrumental diagnostic methods are also of great importance. Ultrasound examination of the urinary bladder and urinary system is used to exclude anatomical abnormalities, the presence of calculi, residual urine, and other factors contributing to inflammation. Cystoscopy is mainly indicated in chronic, recurrent, and atypical forms of cystitis, allowing visual assessment of the bladder mucosa and identification of signs of interstitial inflammation. Additional diagnostic value is provided by modern rapid methods, including urine dipstick tests for leukocyte esterase and nitrites. Their use facilitates rapid screening for urinary tract infections, particularly in outpatient practice. In complex clinical cases, molecular biological methods are employed to identify the pathogen and clarify the etiology of the disease [3,12,15].

The clinical presentation of cystitis is characterized by marked polymorphism and depends on the form of the disease, the severity of inflammation, patient age, and the presence of comorbid conditions. In most cases, the disease has an acute onset

accompanied by typical dysuric symptoms. The main clinical manifestations include frequent urination, burning and pain during micturition, imperative urges, and a feeling of incomplete bladder emptying. Pain is usually localized in the suprapubic region and may intensify as the bladder fills. Changes in urine appearance include cloudiness, unpleasant odor, and, in some cases, the presence of blood (hematuria) [1,4,6].

In acute cystitis, the general condition of the patient is usually only mildly affected. Body temperature typically remains within normal limits or rises to subfebrile levels. However, in cases of pronounced inflammation, weakness, general malaise, and decreased working capacity may occur. In women, clinical manifestations are often associated with gynecological disorders, while in men they may be combined with prostate pathology, which should be considered during differential diagnosis [3,15].

Chronic cystitis is characterized by a relapsing course with alternating periods of exacerbation and remission. During remission, symptoms may be mild or absent, whereas during exacerbations the clinical picture resembles that of an acute process. Prolonged disease duration leads to structural and functional changes in the bladder mucosa, reduced bladder capacity, and the development of chronic pain syndrome. Interstitial cystitis is of particular clinical significance, as it is characterized by persistent pelvic pain, frequent urination, and a pronounced decline in quality of life. This form of the disease requires an in-depth diagnostic approach and comprehensive treatment [1,7,15].

The diagnosis of cystitis is based on a comprehensive evaluation of clinical manifestations and the results of laboratory and instrumental studies. The goal of the diagnostic process is to confirm the presence of inflammation in the urinary bladder, determine its etiology and severity, and exclude complicated forms of the disease. A key stage of diagnosis is laboratory examination of urine. Routine urinalysis reveals leukocyturia, bacteriuria, microhematuria, and changes in physico-chemical properties of urine. The presence of leukocytes and bacteria in urine is one of the main diagnostic criteria for cystitis. To identify the causative agent and select appropriate antibacterial therapy, bacteriological urine culture with antibiotic susceptibility testing is performed,

especially in recurrent, chronic, or complicated cases. In modern practice, rapid diagnostic methods, including urine dipstick tests for leukocyte esterase and nitrites, are gaining increasing importance. These methods allow prompt suspicion of urinary tract infection in outpatient settings and facilitate timely decisions regarding further patient evaluation [3,13].

Instrumental diagnostic methods are used to exclude anatomical and functional disorders of the urinary bladder and upper urinary tract. Ultrasound examination of the urinary system makes it possible to detect thickening of the bladder wall, the presence of residual urine, calculi, and other factors contributing to the development of the inflammatory process. Cystoscopy is performed in cases of chronic, recurrent, and atypical cystitis and allows visual assessment of the bladder mucosa, as well as identification of erosive, ulcerative, and interstitial changes. In complex diagnostic cases, additional methods are employed, including molecular biological and immunological tests, which help clarify the etiology of the disease. Differential diagnosis of cystitis is carried out with urethritis, pyelonephritis, urolithiasis, and urinary bladder neoplasms [6,10].

Laboratory diagnostics of cystitis plays a key role in confirming inflammation of the urinary bladder and determining its etiology. Laboratory methods enable an objective assessment of the presence of infection, the degree of inflammatory activity, and the selection of a rational antibacterial therapy strategy. The main and most accessible method is routine urinalysis. In cystitis, urinalysis reveals leukocyturia, bacteriuria, microhematuria, as well as possible changes in urine clarity and specific gravity. An increased number of leukocytes indicates an inflammatory process, while the presence of erythrocytes may suggest damage to the bladder mucosa [5,10,13].

Microscopic examination of urinary sediment helps clarify the nature of cellular elements and detect bacterial flora. The detection of casts, epithelial cells, and mucus has significant diagnostic value, as it assists in differentiating cystitis from lesions of the upper urinary tract. To confirm the infectious nature of the disease, bacteriological examination of urine is performed, allowing identification of the pathogen and

assessment of its quantitative significance. Urine culture with determination of microbial susceptibility to antibacterial agents is considered the “gold standard” of laboratory diagnosis of cystitis, especially in chronic and recurrent cases. This method ensures individualized selection of antibacterial therapy and helps reduce the risk of antibiotic resistance development [4,11,13].

Under modern conditions, rapid laboratory diagnostic methods are increasingly used, including urine dipstick tests for the detection of nitrites and leukocyte esterase. These methods allow rapid suspicion of urinary tract infection and are widely applied in outpatient practice. In selected cases, molecular biological methods are used to identify specific pathogens and further clarify the etiology of the disease. Cystitis is a common inflammatory disease of the urinary bladder, most often of infectious origin, and remains an important clinical problem due to its high prevalence and tendency to recur. Modern diagnostic criteria for cystitis are based on a comprehensive assessment of clinical symptoms, laboratory findings, and instrumental investigations. Key clinical features include dysuria, increased urinary frequency, urgency, suprapubic pain, and changes in urine appearance. However, because clinical manifestations may vary depending on the form of the disease and patient characteristics, laboratory confirmation is essential. Routine urinalysis plays a central role and typically reveals leukocyturia, bacteriuria, and, in some cases, hematuria. Urine culture with antimicrobial susceptibility testing is considered the gold standard, particularly in recurrent, chronic, or complicated cases, as it allows identification of the causative pathogen and guides targeted therapy. Instrumental methods, such as ultrasound examination of the urinary tract and cystoscopy, are used when indicated to exclude anatomical abnormalities, complications, or alternative diagnoses. In recent years, rapid diagnostic tests and molecular methods have gained importance, enabling faster detection of urinary tract infections and clarification of etiology. The application of modern diagnostic criteria improves diagnostic accuracy, supports rational treatment selection, and helps prevent chronicity and complications of cystitis.[3,9].

Conclusion. Laboratory diagnostics occupies a leading position in the modern system of detection and monitoring of cystitis. The use of routine urinalysis, microscopic examination of urinary sediment, and bacteriological urine culture with antibiotic susceptibility testing enables timely confirmation of inflammation of the urinary bladder and identification of its etiology. The application of rapid diagnostic methods and modern laboratory technologies increases diagnostic accuracy and facilitates early initiation of rational therapy. A comprehensive laboratory approach provides opportunities for monitoring treatment effectiveness, preventing disease chronicity, and reducing the risk of complications.

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