

CYSTITIS: MODERN DIAGNOSTIC AND TREATMENT PRINCIPLES

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Abstract: *This article provides a detailed overview of the etiology, pathogenesis, and clinical manifestations of cystitis, as well as modern diagnostic methods. The main types of the disease, its development factors, progression, and the laboratory and instrumental examinations used in the diagnostic process are also discussed. The article reviews the differential diagnosis between acute and chronic cystitis and modern treatment methods. The importance of early detection and proper treatment in restoring the patient's health is emphasized.*

Keywords: *cystitis, etiology, pathogenesis, clinical signs, diagnosis, treatment, urinary bladder, infection, chronic cystitis, acute cystitis.*

INTRODUCTION

Inflammation of the urinary bladder, known as cystitis, is one of the most common urological diseases, characterized by the development of an inflammatory process in the mucous membrane. In this condition, the function of the bladder is impaired, and pathological changes can be detected in urine analysis. Cystitis can occur in individuals of different ages and genders but is more frequently observed in women. In women, this is mainly due to the proximity of the internal genital organs to the bladder, the short length of the urethra, and factors that facilitate infection, such as menstruation, pregnancy, and the postpartum period. Additionally, chronic inflammation of the internal genital organs plays a significant role in the development of this condition.

Main Part

Cystitis is primarily caused by various infections. In most cases, it is associated with *Escherichia coli* (*E. coli*), although in some patients, microorganisms such as streptococci, *Proteus*, or *Pseudomonas aeruginosa* can also be responsible. Often, mixed infections are detected, such as *E. coli* combined with staphylococci or staphylococci with *Proteus*. When *Proteus* or *Pseudomonas aeruginosa* is involved in the development of cystitis, the disease tends to be more severe and more difficult to treat. Pathogenic microorganisms can enter the bladder through several routes: ascending from the urethra, spreading from the genital organs, from the colon and pelvic region, or via hematogenous or lymphogenous pathways from other purulent infectious foci in the body (for example, tonsillitis, pulpitis, paracystitis, prostatitis, etc.) [1].

In some cases, cystitis may originate from external factors, especially after medical instruments are introduced into the urinary tract. In recent years, cases of cystitis associated with *Trichomonas* infection have also increased. The disease most commonly develops when the body's immune defenses are weakened. The following factors contribute to this: chronic fatigue, poor nutrition, vitamin deficiencies, infectious diseases, impaired intestinal function,

inflammatory processes in the pelvic area, tumor-like diseases of the prostate gland, urethral strictures, chronic constipation, and exposure to cold [2].

The habit of retaining urine and delaying urination often exacerbates problems caused by trophic changes in the bladder, as well as mechanical pressure on it or certain disorders of the nervous system, ultimately leading to the development of cystitis. Research shows that prolonged urine retention and delayed urination are considered risk factors for the onset of this disease.

In rare cases, cystitis can occur as a complication in patients who have undergone radiation therapy (radiotherapy) due to oncological diseases affecting the bladder or nearby organs (e.g., the cervix or other pelvic areas). Furthermore, following the initiation of sexual activity, infections can ascend to the bladder, resulting in what is known as defloration cystitis [3]. Occasionally, chemical agents such as nitrobenzene may damage the bladder mucosa, leading to a non-infectious form of cystitis.

Cystitis is classified into the following types:

- According to clinical course: primary and secondary; acute and chronic forms are distinguished [4].

- According to etiological criteria: infectious (specifically, specific and non-specific) and non-infectious (caused by chemical, thermal, toxic drugs, or certain food products). Secondary cystitis usually develops as a consequence of other underlying diseases. For example: bladder stones, tumors, prostate adenoma or cancer, urethral stricture, and inflammatory processes in the genital organs may contribute to its onset.

Based on pathological-anatomical appearance, the following types are differentiated:

- follicular;
- cystic;
- emphysematous;
- hemorrhagic;
- proliferative;
- ulcerative-necrotic cystitis.

According to clinical-geographic distribution:

- trigonal (trigonitis);
- involving the neck area;
- diffuse (involving the entire bladder) forms of cystitis are distinguished.

Depending on the form of cystitis, various degrees of changes occur in the bladder mucosa: from simple redness to necrotic processes. For acute cystitis, a classic “triad” of symptoms is characteristic, including lower abdominal pain, increased frequency of urination (pollakiuria), and pus in the urine (pyuria). If cystitis develops in a hemorrhagic form, the primary symptom will be visibly noticeable blood in the urine (macrohematuria) [5]. Pain may occur at the beginning, end, or throughout the entire process of urination. In young boys, pain is often noted at the glans penis. As the disease progresses, severe pain develops in the bladder area, accompanied by tenesmus (straining to urinate). If the inflammatory process spreads to the perivesical tissues (paracystitis), pain during urination becomes even more intense. Pollakiuria may persist throughout the day, and its severity depends on the form of

cystitis: from mild catarrhal inflammation to severe inflammation leading to urinary incontinence.

Especially when the cervix of the bladder and the trigone area are affected, urination becomes significantly more frequent. In young children, acute cystitis often causes urinary retention due to pain-induced spasm of the urinary sphincter. In cases of pronounced pyuria, the urine appears cloudy, which can be seen with the naked eye; in rare cases, pyuria is only detected microscopically. Many patients experience blood at the end of urination (terminal hematuria). Body temperature usually remains normal and only rises in cases of gangrenous cystitis, pyelonephritis, or paracystitis.

The diagnosis of acute cystitis is based on clinical signs and urine test results (leukocyturia and bacteriuria). Occasionally, a small amount of protein (albuminuria) and hematuria may also be detected in the urine. Pain during palpation of the suprapubic area and bladder, as well as pain identified during vaginal examination in women, are among the diagnostic criteria. In cases where complications have spread to the kidneys, cystoscopic examination may reveal impaired excretion of indigocarmine dye in the ureteral orifices [6].

Radiological examinations help to identify the presence of stones, diverticula in the bladder, or vesicoureteral reflux. If acute cystitis is treated fully and promptly, the patient can make a complete recovery. However, according to statistical data, recurrence (relapse) of cystitis occurs in 12-17% of cases [7]. Chronic cystitis often develops as a consequence of other primary conditions. The only exception is cystic cystitis, which may occasionally occur in the presence of cysts in the bladder and is often detected incidentally during the investigation of other diseases.

Conclusion

Cystitis is one of the most common inflammatory diseases of the bladder and directly affects the patient's quality of life. Both infectious and non-infectious factors play a key role in the development of the disease. If acute cystitis is treated fully and in a timely manner, the patient can recover completely without residual effects.

However, in some cases, if treatment is delayed or inadequate, cystitis can become chronic and recurrent.

Diagnosis should be based on clinical symptoms, urinalysis, and instrumental examinations. In addition, it is important to perform a differential diagnosis of cystitis with other urogenital diseases.

Modern treatment methods, including antimicrobial agents, symptomatic medications, and physiotherapeutic procedures, contribute to a favorable outcome.

At the same time, educating patients about hygiene practices and promoting the prevention of cystitis can help reduce the incidence of the disease.

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