ISSN 2181-3187

NEUROGENIC DYSFUNCTION OF THE BLADDER

Abdukadirova D.T. , Abdukadirov U, T., Nematov Zh
Andijan State Medical Institute, Department of Neurology

An overview of one of the important problems — neurogenic dysfunction of the bladder is presented. Urodynamics of the bladder is studied not only by urologists, but also by nephrologists. This is primarily due to the high prevalence of neurogenic bladder dysfunction, frequent complications and the high social significance of the problem. The issues of classification of neurogenic bladder dysfunction, pathogenesis, diagnosis and clinical course are considered. The unified principles of classification and diagnostic criteria proposed by the International Society for Urinary Incontinence (ICCS) are presented. The modern principles of therapy of neurogenic bladder dysfunction are considered in detail, the most common classes of drugs are given.

Keywords: neurogenic bladder dysfunction, causes, diagnosis, treatment.

НЕЙРОГЕННЫЕ ДИСФУНКЦИИ МОЧЕВОГО ПУЗЫРЯ.

Абдукадирова Д.Т. , Абдукадиров У, Т., Нематов Ж
Андижансвий Государственный медицинский институт,
Кафедра Неврологии

Представлен обзор одной из важных проблем — нейрогенной дисфункции мочевого пузыря. Изучением уродинамики мочевого пузыря занимаются не только урологи, но и нефрологи. Это прежде всего связано с высокой распространенностью нейрогенной дисфункции мочевого пузыря, частыми осложнениями и высокой социальной значимостью проблемы. Рассмотрены вопросы классификации нейрогенной дисфункции мочевого пузыря, патогенеза, диагностики и клинического течения. Приведены унифицированные принципы классификации и диагностические критерии, предложенные Международным обществом по неудержанию мочи (ICCS). Подробно рассмотрены современные принципы терапии нейрогенной дисфункции мочевого пузыря, приведены наиболее распространенные классы препаратов.

Ключевые слова: нейрогенная дисфункция мочевого пузыря, причины, диагностика, лечение.

ISSN 2181-3187

Neurogenic bladder is a dysfunction of the bladder caused by congenital or acquired pathology of the nervous system. Depending on the state of the detrusor, hyper- and hyporeflective types of pathology are differentiated. The disease can manifest itself as pollakiuria, urinary incontinence or its pathological delay. Diagnosis of the syndrome consists in a complete neurological and urological examination (tests, urography, ultrasound of the kidneys and bladder, uroflourometry, cystography and cystoscopy, sphincterometry, radiography and MRI of the spine, MRI of the brain, etc.). Treatment may include non-drug and drug therapy, catheterization of the bladder, surgical intervention.

The urgency of the problem is primarily due to the high prevalence of neurogenic dysfunction of the bladder, according to Russian researchers, is 6-15%. However, most foreign authors point to an even greater frequency in the population – 10-30%

Urination disorders have a social aspect, since they can limit a person's physical and mental activity, create a problem of his social adaptation in society. Pathology is often accompanied by myofascial syndrome, pelvic venous congestion syndrome (venous congestion). In more than 30% of cases, the development of secondary inflammatory and dystrophic changes from the urinary system is observed: vesicoureteral reflux, chronic cystitis, pyelonephritis and ureterohydronephrosis, leading to arterial hypertension, nephrosclerosis and chronic renal failure, which can threaten early disability (accompanying neurogenic dysfunction of the bladder in 60% of cases).

The classification is based on the results of urodynamic studies:

1. Hyperreflective bladder:
• unadapted (non-inhibited);
• adapted.
2. Normoreflective:
• unadapted (not inhibited).
3. Hyperreflective bladder postural (postural hyperreflection of the bladder):
unadapted (non-inhibited);
• adapted.
4. Normoreflective bladder postural: unadapted (non-inhibited).
5. Postural hyporeflective bladder:
• unadapted (not inhibited).

The bladder is considered normoreflective if urination occurs with a normal volume of the bladder. If involuntary muscle contractions of the bladder occur when its volume is less than normal and do not respond to volitional efforts, they speak of hyperreflection of detrusor. According to the recommendations of the International Society for Urinary Retention (ICS), bladder hyperactivity is divided into neurogenic (when the patient has a neurological pathology) and idiopathic (when the cause is not

ISSN 2181-3187

clear). The hypoactivity of detrusor is defined as a decrease or absence of its contractile activity during the excretion phase, leading to a violation of bladder emptying.

The urgency of the problem of bladder dysfunction is due not only to a violation of the quality of life, but also to the complications that its neurogenic dysfunction leads to. Difficulties in terminology and classification are dictated by the interdisciplinary nature of pathology. The heterogeneity of the nature, severity, level and stage of lesions of the nervous system determines the variety of clinical variants of the NMP syndrome in these diseases and explains the peculiarities of clinical transformations of the syndrome in dynamics. In addition, as is often the case with the defeat of systems of combined vegetative-animal regulation, NMP syndromes are often "overgrown" with functional neurotic components, which sometimes become decisive.

Violation of the accumulative and evacuation functions of the bladder are often accompanied by various forms of urinary incontinence (classification according to Vishnevsky E. L.):

Imperative (motor and sensory);

Stressful (under stress);

Reflex;

From overflow: - Small volume (150 ml long), - medium volume (150-399 ml), - large volume (more than 300 ml), total;

Combined.

Diagnosis, assessment of dynamics and therapy of neurogenic bladder dysfunction syndromes is both a neurological and urological task.

The choice of treatment tactics for the patient depends on the type and severity of bladder dysfunction, the effectiveness of previously used therapies and the presence of combined pathology or complications from other organs and systems.

All therapeutic measures used for neurogenic bladder dysfunction can be divided into three main areas: 1) non-drug treatment, 2) drug therapy. 3) surgical treatment.

The basic principle is the beginning of therapeutic measures with the least traumatic and giving the least number of side effects techniques.

Non-drug treatment. The advantage of non-drug methods of treatment is the almost complete absence of side effects and restrictions to subsequent types of treatment, as well as the possibility of combining with drug therapy.

Non- drug treatment includes:

- bladder training, which consists in observing the patient's pre-established urination plan with a progressive increase in the interval between them;

- carrying out a set of exercises for pelvic muscles using the biofeedback method;

- physiotherapeutic methods (electrical stimulation, laser, hyperbaric oxygenation, thermal procedures, diadynamic currents, amplipulse, ultrasound, etc.).

ISSN 2181-3187

Pharmacotherapy. Currently, pharmacotherapy is one of the most common and effective methods of treating neurogenic bladder dysfunction. This method is available, it can be used for a long time and can be adjusted. The targets of pharmacotherapy can be conditionally divided into central and peripheral. The central areas include the control of urination in the spinal cord and brain, the peripheral – the bladder, urethra, peripheral nerves and ganglia. In the lower urinary tract, most receptors are cholinergic muscarinic, and –adrenergic and purinergic. Based on the distribution of receptors in the bladder and the characteristics of the contractile response during their stimulation, the experience of recent decades has determined the range of use of several groups of drugs.

Among the drugs used in violation of the accumulative-preserving function of the bladder, the restoration of which occurs by inhibiting hyperactivity and hypersensory activity of the bladder, increasing its volume and improving sphincter mechanisms. The most common are used in practice, and it is worth noting. Anticholinergic drugs are still the most effective.

One of the most famous and oldest representatives of this group is atropine. Which has a pronounced systemic effect. In practice, atropine was used orally and subcutaneously. Foreign researchers have proven reliable efficacy and safety of its intravesical use. According to the ICS recommendations, atropine is currently not used in the treatment of bladder hyperactivity due to a large number of side effects, although the use of this drug in the former CIS countries has not lost its popularity until now. The most common method of administration now is electrophoresis.

The next drug, the most well-known and widely used in practice, which, in addition to a moderate anticholinergic effect, has a depressing effect on smooth muscles, is oxybutynin hydrochloride prescribed at a dose of 2.5 to 5 mg 2-3 times a day. Initially, the drug was created in the 60s of the last century for the treatment of hypermotor disorders of the gastrointestinal tract, but now it has found wide application in the treatment of an overactive bladder.. For more than two decades, oxybutynin has established itself as the "gold standard" in the treatment of neurogenic bladder dysfunctions. Despite the fairly high efficacy of the drug, proven by numerous clinical studies, it has a number of negative features. First of all, it is low selectivity for detrusor, which causes the development of side effects such as dry mouth. Decreased visual acuity, constipation, unpleasant sensations and abdominal pain, as well as the presence of side effects from the central nervous system – drowsiness, impaired cognitive functions. In some cases, they served as the basis for discontinuation of treatment. the search for ways to reduce the severity of side effects led to the introduction of intravesical use of oxybutynin, the effectiveness and safety of which has been studied in sufficient detail.

ISSN 2181-3187

Tolterodine is a fairly new drug, the first of a group of anticholinergic drugs developed specifically for the treatment of symptoms of hyperactivity of the bladder. Today in the USA it is the most commonly prescribed drug for patients with this pathology. The international program of clinical trials of the drug is one of the most extensive. Tolterodine does not have receptor selectivity, but in clinical studies it has a more selective effect on the smooth muscles of the bladder than on the salivary glands. The use of tolterodine leads to a decrease in the frequency of urination and episodes of urinary incontinence. Dysuric phenomena disappear, and the volume of urination increases.

Information about the first results of the use of tolterodine appeared in the foreign press. Thus, it was found that 73% of patients taking the drug had an improvement or change. The efficacy was comparable to that of oxybutynin, and the tolerability was significantly better. The important results of the study were the complete absence of tolerance development with prolonged (more than 12 months) use of the drug.

The effectiveness and safety of long-term use of tolterodine has been confirmed by the International Society for Urinary Retention.

The prospect of improving tolterodine tolerance was the appearance of its new form – the so-called delayed-release tolterodine, which has greater effectiveness. In a comparative clinical study, the efficacy of oxybutynin and delayed-release tolterodine was evaluated. The data obtained showed greater efficacy of oxybutynin and delayed-release tolterodine in relation to daytime urinary incontinence than that of conventional tolterodine. Delayed-release oxybutynin is significantly more effective than any form of tolterodine against urinary incontinence and pollacuria.

It should be noted that the use of many drugs with anticholinergic action cannot be evaluated as effective, primarily due to the lack of significant differences compared to placebo and the severity of side effects. Currently, clinical trials of highly selective antagonists of M3 receptors - darifenacin and solifenacin - are being conducted.

From the group of drugs that have a mixed effect, in addition to oxybutynin, the following drugs are used in foreign practice: propiverine and terodilin, which give an anticholinesterase effect and block calcium channels. Propiverine – increases the capacity of the bladder, reduces the amplitude of the maximum contractions of detrusor. Side effects characteristic of antimuscarin drugs are observed when using propiverin in 20% of patients. Controlled clinical studies by European and Japanese scientists have proven the effectiveness of the drug in patients with bladder hyperactivity symptoms. Propiverine is well tolerated, compared to oxybutynin, especially with respect to the frequency and severity of dry mouth.

Of the drugs acting on membrane channels, calcium antagonists and potassium channel activators attract special attention. The role of calcium as an intermediary for the transmission of extracellular impulses into the intracellular space is well known.

ISSN 2181-3187

Therefore, drugs that reduce the intake of calcium into the smooth muscle cell contribute to a decrease in the contractile activity of detrusor. The most typical representative is nifedipine. When it is used in patients with detrusor instability, the bladder capacity increases, the frequency of urination and the amplitude of involuntary contractions decrease. Currently, there is no drug selectively blocking calcium channels of bladder tissues. According to the available data, systematic therapy with calcium channel antagonists due to the filling effects cannot be basic in the treatment of an overactive bladder.

Potassium channel activators are one of the promising drugs for the treatment of disorders of the accumulative function of the bladder, since they can suppress only involuntary contractions of detrusor, without affecting normal urination. However, insufficient knowledge and high frequency of side effects do not allow to recommend these drugs for practice today.

The use of prostaglandin synthesis inhibitors (flubiprofen, indomethocin), the mechanism of action of which is associated with a decrease in prostaglandin synthesis by inhibiting the activity of prostaglandin synthetase, which helps to reduce the contractile activity of the bladder, is limited by the fact that the dosage required to relieve symptoms of hyperactivity significantly exceeds the average therapeutic. At the same time, the use of a drug of this group in high doses causes known side effects and makes it unsafe.

As for the drugs from the group –adrenomimetics, by now the experience of their use is insignificant, despite the fact that more than 20 years have passed since the first studies of their effectiveness in detrusor hyperactivity.

Vasopressin analogues are clinically effective in situations where the rhythm of vasopressin secretion is disrupted and enuresis is observed. There is evidence of their use in the treatment of nocturia in patients with hyperactive bladder.

Tricyclic antidepressants are effective when administered orally. There are reports of increased efficacy when combining therapy with anticholinergic drugs or oxybutin.

The use of these drugs in general clinical practice is limited due to their psychotropic nature.

The large–scale use of adrenoblockers in men with benign prostatic hyperplasia, their effectiveness against irritative symptoms served as a reason for a deeper study of the pathogenesis of the action of these drugs. Currently, it has been proven that they affect not only the receptors of the smooth muscles of the lower urinary tract, which is manifested by relaxation of the neck of the bladder, posterior urethra and a decrease in urethral resistance, but also on –adrenoreceptors located in the detrusor vessels, due to which blood circulation is activated and its significant improvement in adaptive function, which leads to a decrease in severity of urination disorder. Currently, the

ISSN 2181-3187

obtained results of the use of doxazine allow us to consider it promising to further study and introduce them into the practice of treating urination disorders.

Among other drugs used in the treatment of cumulative bladder dysfunction, capsacin, contained in hot pepper and actually being a neurotoxin, and its super–strong analog, resinferatoxin, are mentioned. The use of these drugs disrupts the afferent sensitivity of the bladder and inhibits the activity of detrusor, i.e. leads to primary sharp excitation followed by prolonged immunity. Intravesical use of these substances seems promising in the treatment of refractory hyperreflexia in patients with various neurological diseases.

Botulinum toxin. In 2002, a study was presented that demonstrated the effectiveness of injections of this drug into the wall of the bladder or urethra in the treatment of hyperactive and neurogenic bladder. As a result, the elimination or relief of symptoms of the disease was observed. Given the almost complete absence of side effects, prolonged (up to 6 months) clinical effect, the use of botulinum toxin seems quite promising in the treatment of hyperreflexia and stable forms of hyperactivity of the bladder, sphincter dissinergia, infravesical obstruction.

I would like to mention one more drug that is often used in practice – this is the well-known picamilon. Since the understanding of the importance of disorders of vesicular circulation and detrusor energy metabolism in the pathogenesis of urination disorders has recently increased, picamilon, which has antihypoxic and antioxidant effects in addition to nootropic, is simply a necessary addition to first-line drugs.

Currently, along with anticholinergic drugs, adrenoblockers are almost always prescribed. For the same purpose, the composition of combination therapy includes succinic acid preparations, coenzyme forms of vitamins.

With regard to the treatment of disorders of the expelling function of the bladder, the main task is to ensure its regular and effective emptying – starting with forced urination, evacuation of urine using external compression (taking Cred) and ending with periodic or permanent catheterization of the bladder. Of the medications, the most effective is the use of ubredit, which allows to reduce the effective volume of the bladder, the amount of residual urine and thereby reduce the frequency of catheterizations. Proserin is more often used by electrophoresis on the detrusor area. It is also necessary to correct hypoxia and metabolic disorders of the bladder wall by prescribing vitamin therapy, drugs from the nootropics group - adrenoblockers, antioxidants. Usually, physiotherapy is performed in parallel with drug therapy.

In case of ineffectiveness of conservative methods of treatment, as well as organic causes of urination disorders, various surgical techniques are used, depending on the level of lesion.

Thus, the correct and individual selection of modern methods of treatment of neurogenic bladder dysfunctions opens up new opportunities in solving a number of

ISSN 2181-3187

important medical, social and psychological problems, helps to improve the quality of life of patients and increase their social activity.

Literature

1. Astapenko A.V., Likhachev S.A., Zabrodets G.V. Neurogenic bladder: pathogenesis, classification, clinic, diagnosis, treatment. Belarusian Medical Journal 2002; 2: 4-6. (Astapenko A.V., Likhachev S.A., Zabrodets G.V. Neurogenic blade: pathogenesis, classification, clinical features, diagnosis, treatment. Belorusskij Medicinskij Zhurnal 2002: 2: 4-6.)

2. Alyaev Yu.G., Grigoryan V.A., Gadzhieva Z.K. Urination disorders. Moscow: Litera 2006; 208. (Alyaev J.G., Grigoryan V.A., Hajiyev Z.K. Urinary disorders. M: Litera 2006; 208.)

3. Borisova S. A., Zorkin S. N., Artyukhina S. V. Modern pharmacotherapy of neurogenic bladder dysfunction in children. Pediatric Pharmacology, 2003, t 1, No. 4, pp. 28-32

4. Vishnevsky E.L. Hyperactive bladder. Materials of the plenum of the Russian Society of Urologists. Tyumen 2005; 322-351. (Wisniewski E.L. Hyperactive blade. Materials plenum of the Russian society of urology. Tyumen 2005; 322—351.)

5. Zorkin S.N., Gusarova T.N., Borisova S.A. Neurogenic bladder in children. Possibilities of pharmacotherapy. The attending physician 2009; 1: 37-39. (Zorkin S.N., Gusarova T.N., Borisova S.A. Neurogenic blade in children. Possibilities of pharmacotherapy. Lechashhij vrach 2009; 1: 37-39.)

6. Morozov S. L. Russian Bulletin of Perinatology and Pediatrics, 4, 2013, pp. 24-29.

7. Athanascopoulos A., Gyftopoulos K., Giannitsas K., Fisfis J. Combination treatment with an blocker plus an anticholinergic for bladder outlet obstruction: a prospective, randomized, controlled study. J Urol 2003; 169: 2253—2256.

8. Bauer S.B. Neurogenic bladder: etiology and assessment. Pediatr Nephrol 2008; 23: 4: 541—551. 19. Andersson K.E., Arner A. Urinary bladder contraction and relaxation: physiology and pathophysiology. Physiol Rev 2004; 84: 935—986.