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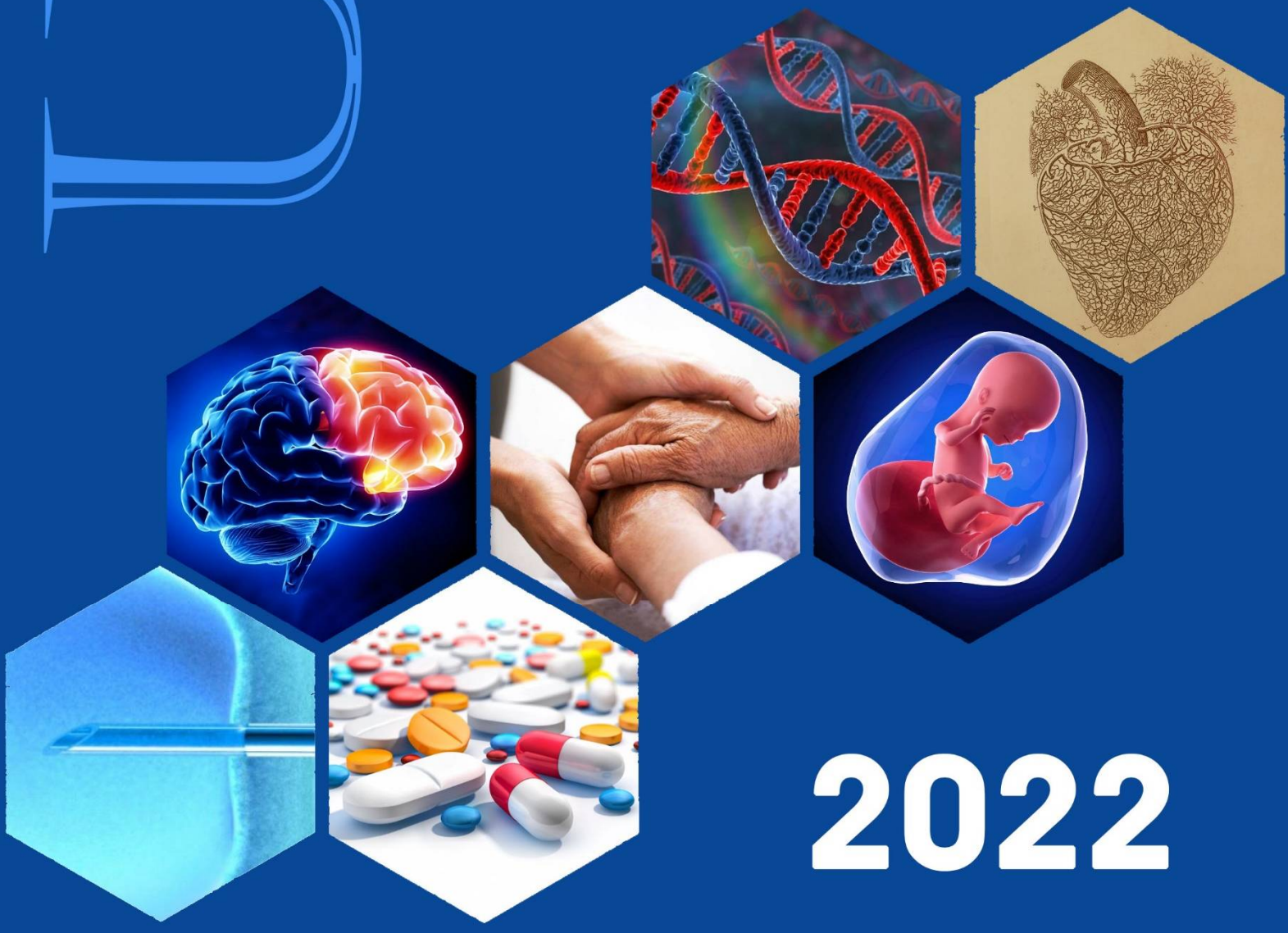

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MODERN APPROACHES TO THE DIAGNOSTICS AND TREATMENT OF URINATION DISTURBANCES IN PREMENOPAUSAL WOMEN

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ABSTRACT

The treatment of bladder dysfunctions continues to be a complex and largely unsolved problem. The disease affects the most complex mechanisms of the relationship of the detrusor-sphincter systems, disrupts all three functions of the bladder - the accumulation, retention and expulsion of urine. The analysis of modern literature concerning the etiology and pathogenesis of urinary incontinence, the correlation between the level of sex steroids and hormone replacement therapy shows that there are still no standards for effective treatment of this pathology.

Keywords: urinary incontinence (UI), overactive bladder, premenopausal period, bladder dysfunction, detrusor.

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СОВРЕМЕННЫЕ ПОДХОДЫ К ДИАГНОСТИКЕ И ЛЕЧЕНИЮ НАРУШЕНИЯ МОЧЕИСПУСКАНИЯ У ЖЕНЩИН В ПРЕМЕНОПАУЗАЛЬНЫЙ ПЕРИОД

АННОТАЦИЯ

Лечение дисфункций мочевого пузыря продолжает оставаться сложной и во многом нерешенной проблемой. Заболевание затрагивает сложнейшие механизмы взаимоотношений детрузорно-сфинктерных систем, нарушает все три функции мочевого пузыря — накопление, удержание и изгнание мочи. Анализ современной литературы, касающейся этиологии и патогенеза недержания мочи, взаимосвязи между уровнем половых стероидов и заместительной гормональной терапией, показывает, что до сих пор отсутствуют стандарты эффективного лечения данной патологии.

Ключевые слова: недержание мочи (НМ), гиперактивный мочевой пузырь, пременопаузальный период, дисфункция мочевого пузыря, детрузор.

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PREMENOPAUZAL DAVRDAGI AYOLLARNING SIYDIK AJRATISH BUZILISHINI TASHXISLASH VA DAVOLASHDA ZAMONAVIY YONDASHUVLAR

ANNOTATSIYA

Qovuq disfunktsiyasini davolash murakkab va asosan hal qilinmagan muammo bo'lib qolmoqda. Kasallik detruzor-sfinkter tizimlari munosabatlarining eng murakkab mexanizmlariga ta'sir qiladi, siydik pufagining barcha uchta funktsiyasini - siydikni to'plash, ushlab turish va chiqarib yuborishni buzadi. Siydik chiqarishning etiologiyasi va patogenezi, jinsiy steroidlar darajasi va gormonlarni almashtirish terapiyasi o'rtasidagi bog'liqlik bo'yicha joriy adabiyotlarni tahlil qilish shuni ko'rsatadiki, ushbu patologiyani samarali davolash uchun hali ham standartlar mavjud emas.

Kalit so’zlar: siydik tutaolmaslik (ST), giperaktiv qovuq sindromi, premenopausal davr, qovuq disfunksiyasi, detruzor.

Introduction. Premenopause is a natural period in a woman's life, however, the high frequency and severity of sex hormone deficiency symptoms significantly reduce the quality of life and turn this period into a kind of illness.

The treatment of bladder dysfunctions continues to be a complex and largely unsolved problem. The disease affects the most complex mechanisms of the relationship of the detrusor-sphincter systems, disrupts all three functions of the bladder - the accumulation, retention and expulsion of urine. An important aspect is that without knowledge of the physiology and pathophysiology of the urinary tract, the diagnosis of urological diseases, including urinary disorders, and their treatment is impossible. Until recently, it was not even a task to give a treatment regimen based on pathogenetic principles and approaches.

The analysis of modern literature concerning the etiology and pathogenesis of urinary incontinence, the correlation between the level of sex steroids and hormone replacement therapy shows that there are still no standards for effective treatment of this pathology. A wide range of hormone replacement therapy drugs with a number of contraindications indicates the need to use alternative methods of correction, such as behavioral therapy in combination with antioxidant agents.

Objective: To study the data of modern literature for the analysis of modern methods of diagnosis and treatment of overactive bladder in premenopausal women.

Materials and methods. The data of modern foreign and domestic literature served as materials. The study was conducted by retrospective data analysis.

Main part.

In recent years, the problem of urinary incontinence in women in the premenopausal period has become a leader among other symptoms of menopausal disorders, due to their extremely pronounced negative impact on the quality of life of this category of patients. The lack of attention to urogenital disorders in our country is evidenced by the widespread opinion among aging women that this pathology is an integral part of aging, as well as the uncertainty of women in the possibility of real medical care [1,5,7,18,24].

Recent studies show that every second woman of the menopause has symptoms of distress from the urogenital tract in the form of urination disorders, urinary incontinence, dyspareunia, dryness and itching in the vagina [Kryzhanovskaya I.O. 2000; Balan V.E., 2004, Apolikhina IA., 2004; Kulakov V.I., 2006;]. Many researchers give differentiation and frequency of this pathological condition. According to Gadzhiyeva Z.K. (2001), the frequency of urinary incontinence (UI) in women living in Moscow is 8.7% at the age of 25-34 and increases to 33.6% at the age of 55-74, while the stress type of UI prevails (78 %).

According to Friedman T. et al. (2018), age, vaginal delivery, chronic constipation, obesity, and changes in hormonal status are recognized risk factors for UI [40]. 25 A similar opinion is shared by De Lancey J. et al. (2003) [32]. According to them, the most significant risk factor is perineal trauma caused by vaginal delivery, leading to disruption of the innervation of the pelvic floor structures. Interestingly, this pathological process can occur not only during childbirth, but also during pregnancy, and does not depend on the method of delivery [32]. Risk factors also include operative vaginal delivery: vacuum extraction of the fetus and delivery with obstetric forceps, as well as a long second stage of labor, that is, those factors that lead to trauma to the pelvic floor muscles [27, 38, 49]. So, recognized reliable risk factors are: parity, vaginal delivery, diseases leading to a prolonged increase in intra-abdominal pressure, such as obstructive pulmonary disease, constipation, high BMI [31, 32, 42, 63]. On the other hand, according to M. Meijerink et al. (2013), a high body mass index did not prove involvement in the development of insufficiency of the pelvic floor muscles [69]. Also, according to a study by Middlekauff M.L. et al. (2016), a significant relationship between an increase in intra-abdominal pressure, in particular during sports exercises, and insufficiency of the pelvic floor muscles has not been identified [56].

The lack of knowledge of the pathogenesis of the formation of UI in women in the premenopausal period leaves its mark on the choice of treatment tactics, both conservative and surgical, the lack of a single treatment and diagnostic algorithm for managing such patients, in which it would be possible to carefully determine the order, as well as the option of both conservative therapy, and surgical treatment, is the main cause of ineffective surgical correction of urinary incontinence.

That is, a woman spends more than a third of her life in a state of deficiency of female sex hormones. Menopause, while not a disease itself, leads to endocrine imbalance in a woman's body, causing hot flashes, irritability, insomnia, urogenital disorders, and an increased risk of osteoporosis and cardiovascular disease. All these data indicate the need to develop a number of medical and social measures to protect health, maintain working capacity and a decent quality of life for women in the peri- and postmenopausal period.

In recent years, the problem of urogenital disorders has become the leader in the symptomatology of menopausal disorders, which is associated with their pronounced negative impact on the quality of life of postmenopausal women. The incidence of age-related urogenital disorders reaches 30%. In the premenopausal period, urogenital disorders occur in 10% of women, while in the age group of 55-60 years - in 50%. By the age of 75, already 2/3 of women experience urogenital discomfort, and after 75 years it is difficult to meet a woman who did not have individual symptoms of urogenital disorders.

Studies by foreign authors show that the prevalence of UI in older women in the US is 37%, in continental Europe - 26%, in the UK - 29%, and in Japan - 27% [Ericson G.F. 2000; Rioux J.E., 2000]. It has been established that if the symptoms of urogenital atrophy in premenopause are usually mild, then with an increase in the duration of postmenopause, not only their frequency increases, but also the severity [54, 86]. Studies conducted in Uzbekistan have shown that among women with UI, the frequency of vaginal atrophy is 22% (Mukhamadieva S.M., Usmanova F.I., 2007). The above indicates the presence of territorial features of the development of urogenital disorders, characteristic of different periods of menopause. Urinary incontinence is not only the cause of significant medical and psychosocial morbidity, but also entails huge economic costs [Buyanova S.N., 2005]. It has been established that 10-20% of gynecological operations are performed for genital prolapse and urinary incontinence. After a hysterectomy, the incidence of vaginal dome prolapse, according to some reports, reaches 43%, and relapse after surgical treatment of prolapse occurs in approximately 30% of cases.

The problems associated with urogenital aging are very relevant for women of older age groups due to their extremely negative impact on the quality of life. According to V.E. Balan (1998) and C.B. The Great (2003) decrease in the quality of life ranges from 4% with isolated vaginal atrophy to 73% with symptoms of urination disorders.

The social significance of the problem is comparable to diabetes mellitus and depression [35,36]. Urogenital disorders are traditionally referred to as postmenopausal, and are considered, in relation to periods of menopause, as "medium-term". Only in recent years it has been established that 10–15% of the symptoms of vaginal atrophy appear already in premenopause, but against the background of regular menstrual cycles, it is difficult to associate them with menopause [1, 4, 14, 34, 35]. Focusing exclusively on estrogen deficiency in the development of climacteric disorders, most researchers lose sight of the fact that progesterone deficiency is of great importance in the pathogenesis of urogenital disorders [35], the receptors for which are found in the structures of the urogenital tract.

In premenopause, the symptoms of urogenital disorders may not be permanent, since this period is characterized by fluctuations in sex steroids and gonadotropic hormones [112]. At the same time, it is known that early, from the premenopausal period, Hormone Replacement Therapy (HRT) is the most effective treatment for osteoporosis and mental disorders [2, 8, 45, 49, 63, 64]. Urinary disorders have a particularly negative impact on the quality of life: from sensory symptoms to various types of urinary incontinence. Studies by domestic authors have shown that severe forms of urogenital atrophy, especially various forms of urinary incontinence, can also be prevented or mitigated by prescribing HRT from the premenopausal period [1,4, 8, 9, 14].

Romashchenko O.V. et al. (2009) in their studies proved that the mechanism of the influence of estrogens on the development of urogenital disorders of the menopause plays a key role in their pathogenesis [50].

A single embryonic origin of all structures of the lower urogenital tract and the presence in them of receptors for steroid hormones, that is, estrogen, as well as the role of estrogen deficiency in the development of all clinical manifestations of urogenital disorders have been established [Balan V.E., 2004].

Structures of the urinary tract and genital tract, i.e. the lower urinary tract (urethra, bladder) and vagina have a single embryonic origin and develop from a single urogenital sinus. Sensitive to estrogen are the mucous membranes, muscles, vessels of the vagina, urethra, triangle and bottom of the bladder. In addition, psychosocial discomfort, which often leads to the development of depression in such patients (1,4). Based on this, urogenital disorders of the premenopausal period are a multidisciplinary problem. Accordingly, a gynecologist, a urologist should take part in the selection of an adequate complex therapy, and, if necessary, the recommendations of a psychotherapist should be taken into account. Patients with UGD require simultaneous monitoring by both a gynecologist and a urologist, therefore, a urodynamic examination including uroflowmetry, cystometry, urethral profilometry, electromyography is necessary in the timely diagnosis of the disorders that have arisen and in the choice of adequate therapy. Galtsev E.V., Kazenashev V.V. Psychosocial discomfort in women with estrogen-related urogenital disorders [50].

Symptoms of vaginal atrophy in 50 - 70% are combined with symptoms of urination disorders [1, 4, 14, 35, 36, 80, 81, 82, 85]. The latter often prevail over vaginal symptoms, however, even in this case, the gynecologist remains the leading specialist in the diagnosis, treatment and prevention of urogenital disorders.

It is known that with an increase in the duration of postmenopause, the state of the vaginal biotope changes: in postmenopause of 5–10 years, vaginal atrophy dominates, while in postmenopause up to 5 years, conditional normocenosis and bacterial vaginosis are more often detected [14, 24, 30, 37]. We did not find data on the state of vaginal microecology in perimenopause in the literature available to us.

To assess the degree of clinical severity of lower urinary tract dysfunctions, the classification developed by J. Blaivas (1988) and recommended for use by the International Committee on Urinary Continence (ICS, 2010) was used [65]. It seems to us that this classification does not affect the choice of treatment tactics, but very accurately in most cases reflects the appearance and change of symptoms over time, so to speak, anamnestically shows the "typical" development of stress urinary incontinence.

In accordance with it, the following five types of stress urinary incontinence are distinguished:

- stress urinary incontinence. Type 0, in which the bottom of the bladder at rest is above the pubic symphysis, and when coughing in a standing position, a slight turn and dislocation of the urethra and the bottom of the bladder is determined; when the neck of the bladder is opened, spontaneous excretion of urine is not observed;

- stress urinary incontinence. Type 1, in which the bottom of the bladder at rest is above the pubic symphysis, but when straining, the bottom of the bladder descends by about 1 cm; when opening the neck of the bladder and urethra, involuntary excretion of urine is noted. Cystocele may not be detected;

- stress urinary incontinence. Type 2a, in which the bottom of the bladder at rest is at the level of the upper edge of the pubic symphysis, and when coughing, there is a significant descent of the bladder and urethra below the pubic symphysis. With a wide opening of the urethra, spontaneous excretion of urine is noted. The cystocele is determined;

- stress urinary incontinence. Type 2b, in which the bottom of the bladder at rest is below the pubic symphysis, and when coughing, a significant prolapse of the bladder and urethra is determined, which is accompanied by a pronounced spontaneous release of urine. A cystourethrocele is found;

- stress urinary incontinence. Type 3, in which the bottom of the bladder at rest is slightly below the upper edge of the pubic symphysis. The bladder neck and proximal urethra are open at rest, in the absence of detrusor contractions. Spontaneous excretion of urine is noted due to a slight increase in intravesical pressure.

Given the high relevance and prevalence of urinary incontinence in women, it is necessary to use standard diagnostic methods to optimize the choice of tactics for its treatment [2, 90]. When analyzing domestic and foreign literature sources, there are a large number of methods for assessing the function of the urethra in women with stress urinary incontinence [31, 59, 75, 76, 88].

The main complaint of patients with this pathology is the involuntary leakage of urine during physical exertion. But this symptom may be common for various forms of urinary incontinence in women [7, 24, 40].

The combination of detrusor overactivity and urethral sphincter insufficiency (detrusor-sphincter dyssynergy) is the most difficult to diagnose, in which, along with the presence of uncontrollable urge to urinate, an increase in the amount of residual urine, symptoms of stress urinary incontinence and overflow incontinence can be observed [19, 21, 25, 45].

Urodynamic study is currently the only objective method for the qualitative assessment of urination disorders. Urodynamic examination of patients with mixed urinary incontinence reveals signs of stress incontinence in combination with detrusor overactivity. However, it is known that the clinical diagnosis is not always confirmed by urodynamic testing [7]. In the studies of foreign authors [13, 14], the prevalence of clinical signs of the disease is 51% among 950 examined patients with urinary incontinence, while the diagnosis was made only in 12% of cases during urodynamic examination.

Detrusor overactivity, clinically simulating stress urinary incontinence, or combined with it, complicates the detection of this form of urinary incontinence and causes erroneous surgical correction of the urinary retention defect, which could often be avoided [4, 8]. The complexity of diagnosing this condition lies in the fact that detrusor hyperreactivity may not be felt by the patient, not accompanied by urge to urinate, but manifest only symptoms of stress urinary incontinence [14, 68, 72]. The experience accumulated in recent years has shown that detrusor hyperactivity can be not only an independent cause of stress urinary incontinence, but also mimic the clinical picture of this disease [61, 66, 74].

According to O.B. Laurana (2001), the traditional set of studies on urinary incontinence in women should include: assessment of complaints and history taking; urination diary; laboratory tests; vaginal examination; cystourethroscopy; excretory urography; ascending cystography; ultrasonographic examination; combined urodynamic study; outpatient urodynamic monitoring; nuclear magnetic tomography [33].

Previously, it was believed that the diagnosis of stress urinary incontinence in women is not very difficult. So, according to J. Rlaivas, the diagnosis of stress urinary incontinence can only be

made on the basis of a carefully collected history and examination of the patient in the gynecological chair. The majority of American scientists adhere to the same opinion [22].

Anamnestic clarification of the type of urinary incontinence should be clear enough, as it determines the direction and scope of further research [3, 7]. It is advisable to assess symptoms by compiling a urination diary, which indicates the frequency of urination, the allocated volume of each urination, the number of episodes of urinary incontinence per day, the use of pads, daily fluid intake, whether urination is accompanied by pain, etc. [5, 56]. For the differential diagnosis of stress and urge urinary incontinence in women, there are a large number of questionnaire tests [22, 76].

Until recently, endoscopic and radiological methods have been used to diagnose stress urinary incontinence in women. However, the complexity of the physiological processes of the lower urinary tract made it necessary to conduct a comprehensive urological, gynecological and neurological examination to identify the causes of urinary incontinence. At the same time, standard research methods may be insufficient for a mixed form of urinary incontinence in women [2, 25, 59, 74].

So, with the help of ureteroscopy, it is possible to identify the presence of structural anatomical disorders and evaluate the urinary function of the urethra. At the same time, the value of this type of study in the diagnosis of stress urinary incontinence and the assessment of the closing function of the urethra is minimal. Thus, the use of endoscopic methods to assess this function is considered inappropriate [24].

The use of such physiological radiological research methods as excretory urography, pyeloscopy, kymography, X-ray cinematography, urethrography, etc., made it possible to study in more detail the functional features of the human upper and lower urinary tract. D.V. Kahn (1986) believed that there is no single characteristic x-ray pattern for stress incontinence, since in women suffering from this disease, not only the size, but also the shape of the urethra changes. The disadvantage of urethrocystography is that it gives an idea only of the anatomical changes in the lower urinary tract, which do not always correspond to clinical data [24].

For a long time, an unresolved issue was the possibility of replacing urethrocystography with ultrasonography [23]. D.J. Johnson et al. (1992) noted that a properly performed perineal or vaginal ultrasound provides the same information as urethrocystography [52]. J. Keskes et al. (1988) used ultrasound in 134 patients and proved that these studies correspond to clinical ones and eliminate the need for urethrocystography and, thus, save patients from radiation exposure [76]. This hypothesis was confirmed by A. Bergman et al. (1988) [84]. In our country, M.B. Afanasiev (1995) convincingly proved the advantages and wider possibilities of ultrasound in patients with urinary incontinence [12]. In addition to assessing morphological changes in the urogenital organs, ultrasound is also used to assess the functional state of the kidneys and urinary tract [53, 60, 64, 71].

As the equipment improved, it became possible to study blood flow, urine flow, based on the Doppler effect, which significantly improved the diagnosis and treatment of urological diseases [36, 46, 58, 62]. It has been proven that the ultrasonographic method is superior in informativeness to urethrocystography and even X-ray cinematography [77, 88].

Currently, the development of computer technology provides new opportunities in the ultrasound examination of the lower urinary tract. One of the promising areas in ultrasound is three-dimensional echography. Three-dimensional reconstruction evaluates the volume, wall thickness in different parts of the bladder, the condition of the mucous membrane of the genitourinary tract, the condition of the internal urethral sphincter, the presence or absence of urethral hypermobility, and it is also possible to determine the blood flow in the bladder neck and urethra. In addition, this method is non-invasive and can be repeated many times [26, 49, 75]. In one of his works, G.A. Digesu et al. (2009) state the possibility of using this study to predict the outcome of surgical correction of stress urinary incontinence [87].

Some authors used such a radiation imaging method as magnetic resonance imaging in the complex diagnosis of stress urinary incontinence, and most often to analyze the results of sling surgeries [87, 162]. S. Raz (1981) gave the leading role in ensuring the correct position of the urethra to the urethrotazic ligaments studied using magnetic resonance imaging [82]. However, there is an

opinion that this method cannot be classified as diagnostic, because. allows to study only the anatomy of the pelvis in patients with stress urinary incontinence [24, 72, 78].

The greatest importance in the diagnosis of urinary incontinence has received urodynamic methods of examination, which allow using a number of tests to determine the dysfunction of the bladder, sphincter system and urinary tract and to select a method for treating these disorders [20, 44, 47, 48].

Urodynamic research methods have significantly supplemented the data on the physiology and pathophysiology of the lower urinary tract. With their help, the hydrodynamic conditions of active and passive urinary continence were determined - the presence of a urethral-vesical pressure gradient and an adequate mechanism for the transmission of intra-abdominal pressure in the bladder [67, 83]. The main methods of complex urodynamic examination (CUDE) for urinary incontinence are uroflowmetry, cystometry, profilometry urethral pressure, electromyography and sphincterometry [57].

With uroflowmetry, the volumetric rate of urination is determined. During the study, the maximum and average urination volumetric velocity, as well as the total urination time and the time to reach the maximum urination volumetric velocity, are recorded. With cystometry, the main indicators of bladder function are determined: capacity, receptive relaxation and a feeling of bladder filling, as well as detrusor contractility, voluntary control of urination. According to electromyography and sphincterometry, one can judge the function of the sphincters of the bladder and urethra, as well as the activity of the pelvic floor muscles [4].

The most commonly used tests when performing profilometry are the measurement of maximum urethral closure pressure (MUCP) and abdominal pressure threshold (AP) [5, 43]. MUCP reflects passive (sphincter tone at rest), and AP - active resistance of the urethral sphincter under tension. Methods for determining insufficiency of the internal sphincter of the urethra (intrinsic sphincter deficiency - ISD) have not yet been standardized. There is no data on the correlation of the results of measuring intraurethral pressure with the severity of urinary stress incontinence, as well as with the results of treatment. In this regard, the use of profilometry as a method for diagnosing stress urinary incontinence is limited [28, 29, 56].

Currently, a new urodynamic device for diagnosing stress urinary incontinence, Monitorr Gynecare, has appeared, with the help of which such an important parameter as urethral retro-resistance pressure (URP) is determined. URP is the minimum pressure required to open the internal bladder sphincter and keep it open. In multicenter clinical studies, a statistically significant relationship between URP and the severity of stress incontinence has been proven: indicators of 60-80 cm aq. Art. determine the mild degree of urinary incontinence during stress or hypermobility of the urethra; from 60 to 47 cm of the water column - urinary incontinence of moderate severity; below 47 cm of the water column - a severe degree of stress incontinence. This indicator is considered a promising diagnostic tool for the detection of stress urinary incontinence [55, 61].

However, there are conflicting data in the literature about the value of a new method for measuring urethral function. Some authors believe that URP does not have a statistically significant correlation with the symptoms of stress urinary incontinence and requires further study [79].

Thus, urodynamic studies are currently an objective method for the qualitative assessment of urination disorders; they determine the choice of optimal tactics for the treatment of urinary incontinence [20, 44, 47]. At the same time, when analyzing literature sources, there are works in which the authors express different opinions regarding the value of urodynamic studies for assessing the function of the urethra in patients with stress urinary incontinence [25, 51, 74].

Indications for surgical treatment are often determined empirically, without taking into account the topography of disorders and the severity of the process, which explains a significant number of recurrences of urinary incontinence, the formation of a group of incurable patients who are forced to live with symptoms of incontinence. In this regard, there is no doubt the expediency of improving the diagnosis of anatomical and functional disorders, determining the possibilities of non-invasive research methods for urinary incontinence [2, 129].

It should be noted that the diagnosis of any disease begins with a correctly collected anamnesis and a correct assessment of the patient's complaints, which are subsequently supplemented by instrumental research methods. The complaints of a patient with stress urinary incontinence are intimate enough to cause embarrassment when talking to a doctor. The clinician must be able to confidently ask those questions that will identify complaints characteristic of stress urinary incontinence in order to continue the diagnostic search in the right direction. The inability, or perhaps unwillingness of a specialist to pay attention to typical complaints and anamnestic data, which in the vast majority of cases are present in women with stress urinary incontinence, leads to the fact that this disease is often hidden behind the diagnosis of chronic cystitis, and patients take long-term and unreasonably antibacterial drugs.

Thus, the lack of a clear algorithm for diagnosing this disease makes it difficult to understand the causes of urinary incontinence and, accordingly, complicates the choice of treatment tactics.

A complex and unresolved problem of urinary incontinence in women is the treatment of UI. The available literature describes many methods for the correction of stress urinary incontinence [13, 17, 18, 26, 30, 38, 52, 70, 86].

As S.B. Petrov, A.V. Kurenkov, D.D. Shkarup (2009), the last decade has been marked by a rapid increase in the interest of urologists and gynecologists in the surgery of stress urinary incontinence in women. Confirmation of this can be found in the global database of the US National Library of Medicine (PubMed). For the period from 1989 to 1998, 902 articles were found for the query “surgical treatment of stress urinary incontinence”, and from 1999 to 2008 – 2270 [39]. The variety of operations is due to the fact that none of them is sufficiently effective [41, 100].

For the first time, the scheme of "Clinical recommendations for the treatment of urinary incontinence" was developed at the 1st International Congress of Physicians on Urinary Incontinence in 1998. The same scheme was used in the preparation of the 2011 Clinical Guidelines [37, 72]. In addition, in order to simplify the choice of methods of treatment, certain diseases have been grouped into one pathophysiological condition, the formulation of which was developed by the International Urinary Incontinence Society (ICS). When choosing a treatment, the following principle was considered fundamental: the least invasive methods of treatment should be used first, in the absence of a positive effect from their use, one should gradually move to more invasive methods [79].

Currently, the treatment of urinary incontinence remains one of the most urgent and complex problems in modern urogynecology. According to the literature, urinary incontinence is noted by approximately 24% of women from 30 to 60 years old and more than 50% of women over 60 years old [1, 4, 9]. According to D. Yu. Pushkar, only a small part of women suffering from this disease seek medical help [9]. Often this is due not only to the intimacy of this problem and the reluctance to discuss it in the family or in the doctor's office, but also to the incompetence of gynecologists and urologists in this matter, as well as to the well-known false judgment that urinary incontinence is a "natural" aging process.

The International Committee on Urinary Incontinence defines this disease as “involuntary excretion of urine, which is a social or hygienic problem, in the presence of objective manifestations of uncontrolled urination”. To date, there are three main forms of the disease: stress urinary incontinence, urge urinary incontinence and mixed (combined form) urinary incontinence.

Urgent urinary incontinence is characterized by the presence of an imperative urge to urinate and associated involuntary loss of urine. An important hallmark of urge urinary incontinence is intact sphincters and normal resistance of the urethra. Stress incontinence is characterized by involuntary loss of urine associated with intravesical pressure exceeding maximum urethral pressure in the absence of detrusor contractions. The term "stress urinary incontinence" is generally accepted, but stress refers to all factors leading to a sudden increase in intra-abdominal pressure: coughing, laughing, sneezing, lifting weights, running, moving from a horizontal position to a vertical one, etc.). This condition is often referred to as stress urinary incontinence (SUI). Mixed urinary incontinence is characterized by a combination of symptoms of imperative (urgent) and stress incontinence.

Modern methods of treatment of urinary incontinence are divided into conservative and surgical. Surgical treatment is more applicable to stress urinary incontinence and is aimed at

strengthening the musculoskeletal apparatus of the pelvic floor or at restoring the function of the internal urethral sphincter. However, any surgical intervention carries a certain degree of risk due to the occurrence of a number of serious complications and is often a forced measure, and not the method of optimal choice.

Conservative treatment includes: 1) drug therapy; 2) training of the pelvic floor muscles using the biofeedback method; 3) physiotherapy (electrical stimulation of the pelvic floor muscles using rectal, vaginal, urethral sensors), etc. Drug therapy is mainly symptomatic, to some extent reducing the manifestations of the disease, but not eliminating its causes. In this case, the therapeutic effect is often short-term and unstable. When taking medications, there is a fairly high risk of side effects; in addition, the cost of drugs is quite high, especially given the need for their long-term use. Therefore, specialists in the field of urology and urogynecology see a way out in the use of methods aimed at using the human body's own reserve-compensatory capabilities [14].

Of great importance in the treatment of imperative urination disorders is the correct choice of a selective modulator of non-hormonal receptors of the genitourinary tract, which is possible only on the basis of the results of a comprehensive urodynamic study. For the treatment of imperative urination disorders, the following drugs are used:

• Oxybutynin chloride (Driptan), a powerful competitive antagonist of M2 and M3 muscarinic receptors in the bladder;

• Tolterodine (Detrusitol), a selective muscarinic receptor antagonist;

• Trospium chloride (Spasmex), has antimuscarinic, antispasmodic and local anesthetic effects. Trospium chloride belongs to the group of parasympatholytics or anticholinergics;

• Solifenacin (Vesikar) is a specific, competitive inhibitor of m-cholinergic receptors, predominantly of the M3 subtype.

These drugs reduce the tone of the smooth muscles of the bladder, have a relaxing effect on the smooth muscles of the bladder detrusor, both due to the anticholinergic effect and due to the direct myotropic antispastic effect; α-blockers (Dalfaz, Kardura, Omnik). The blockade of α-1-adrenergic receptors is accompanied by a stereotypical detrusor reaction, which is expressed in its relaxation during the filling phase, an increase in the reservoir function of the bladder. As a result, significant positive changes in the functional state of the lower urinary tract are achieved in response to limiting the influence of the sympathetic nervous system, which is expressed in the disappearance of pollakiuria and the normalization of the daily urination profile. In addition, the drugs of this group improve the blood supply to the pelvic organs, interrupting the pathogenetic chain associated with the development of bladder ischemia, at the very beginning - at the level of adrenergic receptors.

The proposed drugs for the treatment of stress urinary incontinence: a-agonists - midodrine (Gutron); anticholinesterase drugs - distigmine bromide (Ubretide) and serotonin and norepinephrine reuptake inhibitors - duloxetine (Cymbalta), as shown by numerous studies, are ineffective and not without severe side effects.

Biofeedback (BFB), which, on the one hand, is accessible and safe, and, on the other hand, is pathogenetically substantiated and quite effective, belongs to the category of such methods [6, 14]. The modern method of treating urinary incontinence using biofeedback devices is based on a system of exercises for the pelvic floor muscles, developed by the Californian gynecologist Arnold Kegel (1949) and aimed at increasing their tone and developing a strong reflex contraction in response to a sudden increase in intra-abdominal pressure. The main difficulty and disadvantage of the Kegel technique is that 40 to 60% of patients are unable to contract the pelvic floor muscles in isolation, especially considering that these muscles are anatomically hidden. Instead of activating the pelvic floor muscles, patients typically contract the antagonist muscles such as the rectus abdominis, gluteus, and thigh muscles, further increasing intra-abdominal pressure. Obviously, such exercises are not only ineffective, but also contribute to the aggravation of urinary incontinence [15]. The task of isolated training of various groups of pelvic floor muscles can be most effectively solved by using BFB methods, since in this case visual information is brought directly to the patient, which makes it easy to control the correctness of the exercises. The clinical meaning of this method lies, firstly, in

the constant interaction of the patient and the doctor and, secondly, in the quantitative determination of changes in the tone of the pelvic floor muscles during exercise using various devices: cylinders for measuring rectal and vaginal pressure, probe and needle electromyographs [2]. Currently, modern computer installations are used to train the pelvic floor muscles, in which special vaginal or rectal sensors detect changes in the tone of the working pelvic floor muscles, transform them into EMG signals, which are then amplified and displayed on the monitor as graphic images. In this case, the patient can observe the correctness and effectiveness of their work.

In the practice of foreign healthcare, the biofeedback method has been successfully used in gastroenterology and urogynecology since the 70s. last century [12]. Later, biofeedback techniques were developed for the treatment of eye and nervous diseases, as well as for the rehabilitation of patients in orthopedic practice [5, 6, 7, 8, 10]. Currently, the biofeedback method is widely used both abroad and in Russia. Indications for the use of biofeedback therapy in urogynecological practice are: various types of urinary incontinence in adults and children; pelvic relaxation syndrome or vaginal wall prolapse syndrome; sexual dysfunctions in women (decreased strength of orgasm, anorgasmia, vaginismus); prevention of urinary incontinence in women in the postpartum period after pathological and traumatic childbirth [11, 13].

It should be noted that one of the important advantages of the biofeedback method is its safety. This type of therapy has no absolute contraindications. Relative contraindications are associated with two groups of reasons, which generally fit into either the physical or psychological impossibility of the patient to complete the task assigned to him.

The first group includes the following pathological conditions: diseases that create a fundamental impossibility to achieve a positive effect due to significant anatomical changes in the pelvic organs: malignant tumors, severe infravesical obstruction; local infectious and inflammatory diseases in the acute stage, preventing the use of rectal and vaginal sensors: colpitis, vulvovaginitis, etc.; severe concomitant diseases in the stage of decompensation, such as cardiovascular (unstable angina pectoris, acute cerebrovascular accident), hypertoxicosis, as well as infectious (due to hyperthermia) diseases and injuries.

The second group of relative contraindications can include: age younger than 4–5 years, when the patient cannot realize the task assigned to him due to insufficient development of mental abilities; old age, accompanied by a loss of intelligence; mental illness; lack of motivation and the dependent position of the patient who does not want to take part in the treatment [11, 14].

BFB treatment was carried out on the domestic device "Amblyocor". The course of treatment consists of 15 procedures (3 training programs). Classes were held every day or every other day, the average duration of each was 30 minutes. The exercises performed by patients on the apparatus were based on tonic and phase voluntary contractions of the muscles of the external urethral sphincter (m. pubococcygeus, m. bulbokavernosus) and the external anal sphincter (m. levator ani). Under the phase understand short-term (no more than 1 sec) contractions with a maximum power amplitude (1st training program). With tonic contractions, these muscles must be kept in tension for a longer time - 15–30 seconds (program 3). The 2nd program is aimed at a combination of short phase and long-term tonic contractions of the pelvic floor muscles. 59 patients (92%) of the total number of treated patients underwent two courses of treatment on the Ambliokor apparatus with an interval of 2–3 months. At the same time, an urgent requirement was presented to the patients - to continue training during a break at home.

Thus, the biofeedback method is one of the effective conservative methods for the treatment of all types of urinary incontinence. One of the positive aspects of this type of therapy is its pathogenetic orientation. The effect of biofeedback consists, on the one hand, in the possibility of increasing the activity and contractility of the voluntary urethral sphincter, as well as in achieving its muscle hypertrophy through directed conscious training; on the other hand, as shown by the results of three-dimensional echography, in improving blood circulation and trophic processes in the pelvic area. In addition, according to a number of authors [6, 12], voluntary contractions of the external anal and external urethral sphincters lead to reflex inhibition of the contractile activity of the detrusor, representing the so-called anal-detrusor and urethral-detrusor reflexes, while the high efficiency of

biofeedback therapy becomes clear. in patients with imperative urination disorders. Other important advantages of the BFB method are: painlessness and minimal invasiveness; no side effects; possibility of combination with any other methods of treatment (except electrical stimulation); the possibility of using any other methods of treatment in the future.

Conclusions. The treatment of bladder dysfunctions continues to be a complex and largely unsolved problem. The disease affects the most complex mechanisms of the relationship of the detrusor-sphincter systems, disrupts all three functions of the bladder - the accumulation, retention and expulsion of urine. An important aspect is that without knowledge of the physiology and pathophysiology of the urinary tract, the diagnosis of urological diseases, including urinary disorders, and their treatment is impossible. Until recently, it was not even a task to give a treatment regimen based on pathogenetic principles and approaches.

The analysis of modern literature concerning the etiology and pathogenesis of urinary incontinence, the correlation between the level of sex steroids and hormone replacement therapy shows that there are still no standards for effective treatment of this pathology. A wide range of hormone replacement therapy drugs with a number of contraindications indicates the need to use alternative methods of correction, such as behavioral therapy in combination with antioxidant agents.

Based on the review data, it can be said that there is no single algorithm for the diagnosis and treatment of premenopausal women with overactive bladder syndrome and urinary incontinence. This, in turn, requires a deep study of these problems and the search for modern solutions.

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