Urethra stricture - modern worldviews on etiogenicatogenesis, diagnosis, treatment and prevention

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Introduction: Urethral stricture (US) is a common disease among men and is a complex urological pathology. In recent years, the number of patients with this disease is growing rapidly and varies from 0.6% to 0.9% of the total population, depending on the age of the patients. In 46.51% of men over the age of 45, the main cause of urethral stricture was the result of transurethral surgery, according to data from SV Zhou and co-authors (21). Scholars differ on the U.S... The simplest and most common concept is scarring due to inflammation or traumatic injury of the urethral wall (6, 3, and 9). But can we apply this “concept” to the entire urethra, or to only a specific part of the urethra? Which type of injury (button or acquired) can be called a stricture, depending on its origin?

Key words: urethral stricture, anastomotic urethroplasty, substitution urethroplasty, urethral augmentation, probing, obliteration of the urethra.

Main part: If we look at the history of the stricture of the urethra, DJ Petrov (1862) was one of the first to define the term: R.M. Fronstein (1934) explains that "the stricture of the urethra is the narrowing of its normal opening as a result of organic changes in the wall of the urethra" (11). According to A.B. Aga (1951), "the urethra and the surrounding spongy tissue are narrowing of its opening (not a button anomaly) due to long or short-distance scarring of the body" (12). G.H. Jordon and S.M. Schlosberg believe that the term "urethral stricture" should be applied only to scarring of the anterior urethra. According to L.A. Kudryavtsev, US means an acquired traumatic scarring of the urethra (stenosis is), in other cases it is correct to say "narrowing" (narrowing) (32). According to the International Council of Urologists, SIU, ISUD, (2014), "urethral stricture" means "pathological narrowing of any part of the urinary tract surrounded by a hollow body as a result of the development of spongiosfibrosis" (J.M. Khatini). The most widely used concept in Russia, including in our country - M.I. According to Kogan, "US is a disease of the urinary tract caused by polyetiological causes, accompanied by symptoms of the lower urinary tract" (28). Recently, due to the peculiarities of the pathogenesis and the tendency to recurrence, the term "striction disease of the urethra" is used in the practice of urology, along with the US, as a diagnosis The SIU, ISUD guidelines, published in 2014, further clarify the concepts and definitions associated with urethral narrowing. For example, the terms "striction of the urethra" and "striction of the urethra" refer only to the narrowing of the anterior part of the urethra surrounded by a hollow body. Narrowing of the posterior urethra, which is not associated with pelvic fracture, is called "stenosis are". Artificial narrowing of the prostatectomy is also called "stenosis are" of the vesicourethral anastomosis. Thus, currently the terms posterior urethral stricture or bladder stricture are not recommended for use in practice (19, 20).

Etiology: Typically, risk factors leading to the development of urethral stricture include: old age, sexually transmitted infections from the anamnesis, complications after radical or radiation treatment of prostate cancer, etc. (1.7). However, due to the sharp increase in the absolute proportion of transurethral treatments and surgical interventions in the practice of urology today, the incidence of iatrogenic stricture of the urethra is also increasing (34). Even due to the geographical, socio-economic status of people, the causes and localization of urethral strictures may be different. For example, in developed...
countries, the main cause of urethral stricture in men is iatrogenic, while in developing countries it is traumatization. An example of this is the results of retrospective analyses conducted by D.M. Stein and co-authors in 2013 in a total of 2589 patients treated for urethral stricture in Italy (1646), USA (228) and India (715) (12). That is, in group 1 (Italy and the United States) iatrogenic injuries accounted for 35%, and in group 2 (India) 16%. By localization in the 1st group it was found that the narrowing of the urethra in the penile part was 27%, in the 2nd - 5%, the stricture of the posterior urethra was 34% and 9%, respectively. Meta-analyses by S. Tritescher and co-authors found that iatrogenic factors developed in 45% of cases (due to transurethral treatments and prolonged walking with a urethral catheter). M.A. According to Kogan and co-authors, this figure is 17.7% (83.86.88). M. Lazzer and co-authors identified urethral stricture (UUS) of iatrogenic etiology in 38.8% of 2303 patients (34). A group of Italian scientists, in a large group of 1439 patients, in retrospective studies on the localization of urethral narrowing, found that 92.2% of patients had stricture of the anterior urethra, of which 46.9% - to the bulbous part of the urethra, 30.5% - spongiosis and bulb siss - 19%, narrowing of the entire urinary tract - 4.9% (5). We know that in the last century, more than 90% of urethral narrowing was caused by untreated gonorrhoea. But nowadays, in the age of antibiotics, gonococcal infection is of no importance as a US cause due to effective treatment. Today, inflammatory narrowing is often associated with lichen sclerosis and non-gonococcal urethritis. YaUS is more common in countries with highly developed medicine. The reason for the increase in the disease is undoubtedly the widespread use of minimally invasive transurethral endoscopic operations in the practice of urology. Catheterization, cystoscopy, especially if the diameter of the instrument does not match the diameter of the urethra, in addition to damage to the mucous membrane, leads to the formation of compression zones and ischemia of the urinary tract, which in turn leads to narrowing of the face (7). One of the most common urological diseases known in the elderly and elderly men is benign prostatic hyperplasia (PBXG) (8). Currently, the generally accepted “gold standard” in the treatment of PBXG is transurethral resection of the prostate gland (PBTUR) and its various modifications (35). As a result, according to many authors, urethral stricture, obliteration or sclerosis of the bladder, as an evening complication of adenomectomy. From a nosological point of view, this is a consequence of the performed adenomectomy. That is, during the removal of a large adenoma, the tissue is damaged due to a violation of the integrity of the structure of the posterior part of the urethra or bladder, which then forms a postoperative stricture of the bladder neck or prostate part of the urethra. These complications cannot be called iatrogenic because they are changes that depend on the degree of damage to the urethral tissue during adenomectomy. Late obstructive complications are an important part of adenomectomy complications. The U.S. is one of them, leading to urinary incontinence and requiring long-term treatment. In some cases, surgery is required on the back of the urethra and along the bladder. The formation of urethral strictures in the postoperative period may take several years, but usually develops within the first 6 months. The cause of post-adenomectomy stricture is caused by direct injury to the urothelium and sublingual spondylosis of the body. In this case, the injury can be caused by the development of secondary arthritis through a catheter, resectoscope or instruments. Pathogenesis: The pathogenesis of urethral stricture is based on the occurrence of squamous cell metaplasia of the urethral epithelium and the hollow body tissues that touch it, changes in the extracellular matrix of urethral tissue and the development of spongiofibrosis. The normal connective tissue of the urethral wall is replaced by dense fibrous tissue. These changes cause a decrease in smooth muscle tissue and collagen fibers in the spongy body. As a result, nitric oxide synthesis is reduced, hypoxia of urethral tissue is increased, and the scarring process progresses. Classification: There is currently no single and generally accepted classification of urethral stricture disease, which can cause clinicians some problems in practice. According to the literature, the classification of G. Barghali (2000), which indicates the clinical gradation of urethral stricture based on the etiology of colorectal disease, is used abroad (3, 4, 22, 24) In 1988, J. Mc Aninch proposed the classification of urethral stricture according to the degree of narrowing of the urethra based on the results of urethral sonograms obtained with the introduction of ultrasound into clinical practice (2.36). In Russia, including in our republic, M.I. The Kogan classification uses a cup rock amulet.
Depending on the etiological factors of urethral stricture on MKB-10, the following types are distinguished:
N35.0 Posttraumatic stricture of the urethra.
N35.1 Post infectious stricture of the urethra.
N35.8 Other stricture of the urethra.
N38.9 Idiopathic stricture of the urethra.

Clinic: The clinical manifestations of this disease are directly related to the degree of narrowing of the urethral diameter. In patients with a narrowing of the urethra to 3-5 mm (10-16Sh), there is a decrease in pressure during urination, urination with a thin stream, frequent urination, a feeling of incomplete emptying of the bladder, in some cases, urinary retention and pain in the bladder area during urination complaints are observed. In patients with a history of urinary tract infection, prostatitis, epididymitis, urolithiasis, stricture disease of the urethra may be accompanied by the development of complications such as paraurethral abscess or abscesses (13, 14).

Diagnosis: Examination of patients with US, treatment planning, especially information on patient preparation for surgery is sufficiently covered in the modern literature (20, 22, 32). The standard methods of examination today are the usual urological screening methods: retrograde urethrography, mycotic cystourethrography to determine the narrowed area (localization) of the urethra, its length, permeability. Despite the high sensitivity (75-100%) and specificity (72-97%) of these methods of examination, there are two drawbacks: may lead to the choice of method; second, retrograde urethrography does not allow determining the length and depth of spongiofibrosis, which is a very important factor in the choice of treatment tactics. It should also be noted that in the interpretation of the results of urethrography, there are different cases of interpretation by the human factor, ie by radiologists or urologists. For example, according to data obtained by Eswara and co-authors (2014), 60 urologists and radiologists at Stanford University in Washington and Northwestern University in the United States were asked to evaluate 10 urethrograms. At that time, retrograde urethrograms and mycotic cystourethrograms were correctly interpreted by 18 (58%) of 31 radiologists and 19 (65%) of 29 urologists (15). In another study, the urethrograms of 397 patients who underwent urethroplasty by Canadian urologists were analyzed by radiologists, and in only 49% of cases did the radiographs reveal adequate, i.e., data relevant to the condition detected during surgery. In 13% of patients, even narrowing of the urethra was not reported at all (16). Arthroscopy is one of the main methods to help determine the degree of narrowing of the urethra. In the presence of a suprapubic fistula, it is sometimes recommended to use fibrocystourethroscopy to determine the proximal border of narrowing and the condition of the sphincter apparatus. Regarding the diagnostic value of urethroscopy, the 2014 SIV ICUD Recommendations state the following: - Urethroscopy has been recommended as the most specific method of determining urethral stricture (evidence level 4A). - Urethroscopy - the results of other examinations in the diagnosis of anterior urethral stenosis are recommended as an adjunct in the interpretation of uncertainty (evidence level 3B). Since the mid-1980s, the emergence of sonourethrography, proposed by J.W.Me Anich, has aroused great interest among researchers (17). The sensitivity of this method to the detection of urethral narrowing is 66-100%, and its specificity is 97-98%. Unfortunately, when conducting this study, the accuracy of the stricture length determination is limited to 3-5 cm (36). Also, the shortcomings of this method are directly related to the fact that the doctor conducting the conditional examination is highly qualified in the methodology of its implementation, as well as in the interpretation of the information obtained (19).

Later, scientists from the Mauo Clinic, B. Kim, A. Kawashima, and A.J. Le Roy also proved the importance of magnetic resonance urethrography - sonourethrography and retrograde urethrography, and even CT - in the diagnosis of male urethral pathology (23). In particular, on the basis of scientific research conducted by urologists of Rostov DMU over the past 10 years, it was found that the data obtained using dynamic magnetic resonance retrograde and ante grade spongourethrotomography in stricture of the urethra are almost identical to morphological examinations. Thus, the data show that the method of magnetic resonance urethrotomography is one of the most promising and effective methods for determining the US (length, localization, depth and degree of spongiofibrosis) and plays an important role in planning accurate and quality treatment. The problem is that the value of this verification method is limited in its application in practice today because it is not included in standard protocols. Assessing the degree of lower urinary tract obstruction is of particular importance in the diagnosis of
urethral stricture. That is, each patient will have to undergo a uroflowmetry examination, which will be completed by IPSS, QoL and MIEF-5 questionnaires. Although these inspection methods are basic (although not included in the general standards), the monitor is important in conducting observations in the postoperative period. Treatment: It is well known that until recently, the principle of "surgical ladder" was used in the treatment of urethral strictures. That is, before any planned open complex surgery, of course, expansion of the narrowed area of the urethra by budding, followed by internal optical urethrotomy. If there were no results, open-ended operations would be performed. At present, such an approach is outdated.

In general, US treatments can be divided into 2 major groups: end urethral and open surgeries. Although ineffective (10%), the method of dilatation, which is widely used in urology (to date), is inexpensive, can be easily performed in all patients in an outpatient setting, although it is a simple form of treatment, has a high recurrence rate and many complications. The instructions for using the method is limited (34). According to modern recommendations, in the stricture of the single, short, bulbous part of the urethra (≤1 cm) in the less developed cases of spongiosis, as in the first row, the method of internal optical urethrotomy (IOUT) using a "cold knife" or various lasers (diode, neodymium, golmi), can be used as a method of treatment. In the United States, 20% of urologists currently use laser technology to treat urethral strictures. However, it is not recommended for widespread use because it is costly to perform and has almost the same efficacy as IOUT (26). Since the 1970s, it has been recommended to administer antiglomerulonephritis and ant fibroblast drugs to the sub mucosal layer of the urethra during surgery to reduce recurrence of the disease (23). No significant increase in efficacy was observed with the use of steroids, gynostatics, and glucocorticoids, type 2 cyclooxygenase inhibitors for this purpose (27, 28, and 29).

Along with internal optical urethrotomy, the use of urethral stents has been intensively studied by scientists. However, due to the high incidence of complications (pain in the interstitial area, scarring, stent migration, stone occlusion, urinary incontinence, infection, etc.), this method is not widely used in urological practice today (30, 31). Thus, according to modern recommendations, spongiosis of the urethra, which is less developed, located in the bulbar part, with a length of ≤1 cm, can be performed in the first stage of treatment (32). However, in some debilitated patients or those who refuse radical surgical treatment, these end urethral treatments may be routinely used as palliative care. Although the effectiveness of these end urethral treatments is not higher than 10-35%, most urologists (as in foreign countries) are in a hurry to give it up. However, it should be noted that some authors believe that the unreasonable and widespread use of endoscopic methods, ignoring the instructions for open urethroplasty, can lead to future damage to the anterior urethra and further exacerbation of the disease (33). Today, open reconstructive surgery is considered to be significantly more effective in the treatment of stricture. That is, from these surgeries we can see a low incidence of sung complications and long-term conical results in patients. However, despite the fact that anastigmatic urethroplasty has been performed for more than 100 years; no prospective or randomized studies on this type of surgical treatment have been performed to date. All documents are retrospective cohort studies. According to most experts, the guideline for anastigmatic urethroplasty is: In case of narrowing of the penile part of the urethra, anastomosis is not recommended, because the risk of penis shrinkage and curvature is high. The edges of the respected urethra during anastomosis should be well aligned, which significantly reduces the risk of recurrence (34,35) An analysis of the literature shows that anastigmatic urethroplasty is successful in more than 90% of cases (20). Proper speculation of the edges of the urethra increases the elongation of its edges by about 1.5 cm. Therefore, in limited cases (stricture 2.5-3 cm in length), the use of elongated anastomosis methods or urethral augmentation gives good results when present (28). Underlying urethroplasty is the concept of partial or complete replacement of a narrowed part of the urethra with another tissue patch. Despite the multiplicity of different urethroplasty methods, these operations can be divided into 3 groups.
1. Prolonged urethroplasty (urethral augmentation, urethral augmentation with anastomosis).
2. Stepwise urethroplasty.
3. Tube patch urethroplasty.
Free (in the feeder) patches are used as the plastic material. Free patches are commonly referred to as ‘graft’ (transplantation) and in surgery; the term ‘grafting’
transplantation is used, while the term ‘flap’ is used in transplantation. Both of these methods are also used to lengthen the urethra. The oral mucosa (buccal and tongue patches) is widely used as free patches (Graft). In rare cases, foot patches made from the skin and penis of the penis has been used. However, the use of scrotal skin in recent times is not used at all due to the fact that it contains hair follicles. The use of a patch of the oral mucosa in urethroplasty was first proposed by the Russian scientist K.M. Proposed by Sapejko (1894) (25).

According to the world’s leading experts, the mucous layer of the cheek (buccal) is the most ideal plastic material for urethral transplantation due to the well-developed sub epithelial vascular network, strong and elastic properties, infection resistance and high regenerative capacity of the donor area (19, 26).

Among the development trends in the field of urethroplasty in modern urology practice, we can distinguish the following: Most practicing urologists prefer the transplantation of the oral mucosa, considering the buccal patch as an ideal plastic material for transplantation into the urethra; a clear decline in interest in transplantation of fascial skin patches; The use of textile engineering products seems to be very promising; The emergence of new types of urethroplasty with anastomosis (burning of the anastomosis without cutting the spongy body of the urethra);

Conclusion: Thus, although significant progress has been made in the treatment of urethral narrowing, there are still unresolved issues. Modern standards for diagnosing the degree of stenos is in the U.S. do not allow the assessment of the depth and length of spongiosfibrosis, which can affect both the planning of a specific surgical procedure and the outcome of urethroplasty. In this sense, the introduction of magnetic resonance urethrography in practice can be considered as a promising direction;

Conclusion: The availability of thematic endoscopic instruments has led to the widespread use of endoscopic methods in the United States, which are an alternative to open surgical treatment in terms of their effectiveness in obliteration, stenos is or narrowing of the bladder. In the treatment of short strictures of the urethra of various etiologies, it can be said that in most cases IOUT has completely replaced plastic surgery. A.T. Martov, N.A. According to Lopatkin (2002), the advantage of optical urethrotomy is that you can see the narrowing of the urethra directly in the fall and selectively cut it, as well as prevent other possible complications; the operation is performed in a short time. In case of recurrence, it is possible to repeat (18).

Literature:


results from a randomized trial. BJU Int. 2015;115(4):644–652.


