MINISTRY OF HEALTH OF UKRAINE

ZAPORIZHZHIA STATE MEDICAL AND PHARMACEUTICAL UNIVERSITY

Department of Urology

M. A. Dovbysh, I. M. Dovbysh, O. M. Mishchenko

MODERN DIAGNOSTIC, THERAPEUTIC, ENDOSCOPIC AND INSTRUMENTAL METHODS IN UROLOGY

Educational manual

Zaporizhzhia

2023

UDC 616.6-07-08-072.1(075.8)

D 77

Approved by the Central methodological Council

Zaporizhzhia State Medical and Pharmaceutical University

(protocol no. of " " 2023) and recommended for use in the educational process.

Authors:

M. A. Dovbysh – Professor of the Department of Urology, ZSMPU, doctor of medical sciences, professor;

I. M. Dovbysh – assistant of the Department of Urology, ZSMPU;

O. M. Mishchenko - assistant of the Department of human anatomy, operative surgery and topographic anatomy ZSMPU.

Reviewers:

O. V. Kapshitar - professor of the department of general surgery and post-graduate surgical education of ZSMPU, doctor of medical sciences, professor;

V. I. Pertsov - head of the department of disaster medicine, military medicine and neurosurgery of ZSMPU , doctor of medical sciences, professor.

Dovbysh M. A.

D 77 Modern diagnostic, therapeutic, endoscopic and instrumental methods in urology: educational manual / M. A.Dovbysh, I. M. Dovbysh, O. M. Mishchenko -Zaporizhzhia: ZSMPU, 2023. – 95 P.

The study guide contains a list of knowledge and practical skills that must be mastered by foreign students of the IV year of the international faculty in the discipline "Urology".

UDC 616.6-07-08-072.1(075.8)

CONTENT

CONDITIONAL ABBREVIATIONS

TURP - transurethral resection of the prostate

Tur - tranurethral resection

Microwave-ultra-high frequencies

PH - hyperplasia of the premichuric gland

UUT - upper urinary tract

PNL - percutaneous nephrolithotrexia

UAD - uric acid disease

PPS - percutaneous puncture nephrostomy

PUS - pelvic-ureteral segment

PCS - pelvicalyceal segment

RIRS - retrograde intrarenal renoscopy

PREFACE

Scientific and technological progress has made it possible to widely use various endoscopic aids in urological practice, which are less traumatic than open operations. In addition to endoscopic instruments (resectoscopes, urethrotomes, rigid or flexible ureterorenoscopes, rigid nephroscopes) for their implementation, special devices are needed that generate a particular source of energy that has a therapeutic effect in a particular urological disease. Currently, the Medical University is faced with the task of training specialists of a wide profile, who must have fundamental theoretical knowledge and master practical skills to a sufficiently high degree.

The purpose of the manual: to introduce students to modern endoscopic methods used in urology and teach them how to use them in practice, to introduce them to the methods of instrumental examination of urological patients, to find out the role and place of these methods in the diagnosis and treatment of various diseases, as well as to acquire a value attitude to the acquired knowledge and skills as professionally oriented. Know: diagnostic and therapeutic purposes of endoscopic and instrumental examination of patients. Conditions of catheterization and bougie for diagnostic and therapeutic purposes. The future doctor in his work should, first of all, be able, taking into account the possibilities of various research methods, to prescribe a laboratory and / or instrumental examination to the patient, and then, based on the results obtained, be able to evaluate information about the diagnosis.

Instrumental research methods allow you to establish the correct diagnosis and, accordingly, choose the right treatment method for both providing urgent and planned care to the patient. They are used to treat a number of diseases separately or as the first stage, performing further surgical intervention in more favorable conditions. This manual includes a short theoretical part in the form of a training description of manipulations and schemes.

In the manual, of the illustrative material a link to the source is added. Tasks for test control can be used during extracurricular and classroom training.

The manual "Modern diagnostic, therapeutic endoscopic and instrumental methods in urology" was created in accordance with the work program of the discipline "Urology" on the topic "X-ray, radionuclide, thermographic, ultrasound and instrumental methods of examination of urological patients" 15 hours.

Know: diagnostic and therapeutic purposes of endoscopic and instrumental examination of patients, conditions of catheterization and bougie for diagnostic and therapeutic purposes.

Practical skills:

1. Bulging of the urethra.
2. Insert a catheter into the bladder.
3. Cystoscopy.
4. Urethroscopy.

Set of instruments: catheters, bougie, cystoscope, tow truck, urethroscope, ureteroscope, nephroscope.

Terminology of instruments: Foley catheter; Nelaton catheter; Timan catheter; buj male; Buj female; tow truck; Urethroscope; Cystoscope, ureteroscope, Nephroscope.

HISTORICAL REFERENCE

Urology is a science that studies the etiology, pathogenesis, diagnosis and treatment of diseases of the genitourinary system in men, the urinary system in women, and various pathological processes in the extraperitoneal space.

The history of the development of medical disciplines and medicine in general provides rich illustrated material not only to understand the evolution of local knowledge and opportunities, but also to assess the prospects for this development, to consciously promote their further progress.

From Byzantium, which was then at the apogee of its cultural development, Greek doctors came to Russia, first of all to the ancient monastery of the Kiev-Pechersk monastery. Scant and fragmentary information that has come down to us from this period. Medical, including urological care, was provided to the majority of the population by healers. Monastic and lay doctors often feuded with each other. One can only assume the existence of schools, acquaintance with the works of Hippocrates, Galen, and the creation of medical manuals.

The first, rather the earliest, Guide To Medicine of Kievan Rus, which has come down to us, belongs to Eupraxia (1108-1180). It was called "Alimma"("ointments"). The eighth section of this guide provides recommendations for the diagnosis of a number of diseases based on the physical properties of urine and tips for the treatment of certain diseases of the urinary tract.

At the same time, the works of Avicenna (980-1037), one of the most famous encyclopedists in Central Asia, became widespread. He owns 20 works on medicine, of which the canon of medical science is most well-known. A large place in the" Canon " is given to the diagnosis and treatment of diseases of the kidneys, bladder and urethra, surgical treatment of bladder stones is described in detail, and a number of medications are proposed. Avicenna carefully developed the indications and

techniques for catheterization of the bladder, and for washing it, he designed a piston syringe made from animal skin.

Renaissance - it was at this time that urology was formed as an independent discipline, which is dedicated to the monograph of Francisco Diaz published in Madrid in 1588. Apparently, F. Diaz was a major urologist, which gives reason for some medical historians to find him the founder of urology as a separate medical discipline. The title of the book, as it was accepted, is as complete as possible: "the treatise for the first time publishes about all diseases of the kidneys, bladder and urinary canal, and about urine, in three books, compiled by Francisco Diaz, doctor of Medicine and master of Philosophy at the University of Alcala de Henares by the surgeon of the king, our seigneur. Dedicated to Dr. Valles, chief physician of the king, our Seigneur, and physician of the Royal Court. Printed in the Printing House of Francisco Sanchez in Madrid. The year is 1588." To understand the system of spreading medical knowledge, it is interesting that the book was published at the expense of the author in 1200 copies. A fairly detailed review of the work of F. Diaz in Russian was given by A. Ya. Pitel in the article "on the first major work on Urology, published in the XVI century" (urology and nephrology, 1981 - 1,58-63). This review provides an introduction to the theoretical and practical levels of urology at that time. Its comparison with the achievements of subsequent centuries allows us to maintain great modesty in assessing modern success. Traditionally based on the views of Hippocrates, Aristotle, Galen, Avicenna, canonized to dogma, F. Diaz. it allows itself to disagree with some existing postulates in some places. From these positions, the anatomy of the kidneys, pathogenesis, diagnosis and treatment of kidney stone disease are described. The listed factors contributing to the formation of kidney stones, including previous changes in the renal parenchyma itself, also poor, abnormal nutrition, and the origin of urinary stones is associated with geographical features of the area, climatic conditions. Figuratively described renal colic, irradiation of pain in renal colic, diseases accompanied by hematuria, purulent inflammation of the kidneys (nephritis) as a complication of renal stone disease,

secondary origin of bladder stones, apostematous nephritis, phlegmon of the fat capsule of the kidney, methods of drug therapy of urolithiasis. The greatest attention is paid to a thorough description of surgical interventions and urological surgical instruments, which included various stone hooks, probes, catheters, special spoons for removing stones, surgical mirrors and expanders used for perineal lithoextraction, instruments for internal urethrotomy.

The ancient rule of Medicine runs through the book: "to heal whenever possible, but to ease suffering - always." Swiss surgeon Pierre Frank (1500-1570), who in 1556 successfully performed a high-cross-section operation of the bladder with stone extraction in a two-year-old child, is widely known for successfully performing urological operations. Milan Cardan (J. Cardan, 1501-1576), who extracted 18 stones from a collapsed renal parenchyma after emptying an abscess in the lumbar region and described this rare case. Italian Ferry, French surgeon pare-contemporaries of F. Diaz-deserve sincere admiration.

The name of Ivan Fyodorovich Bush (1771-1843), the founder of the surgical school, occupies a special place in the history of Russian urology. V. F. Bush and his students enriched urology with significant discoveries, laid the foundations for the further development of Russian urology and its separation into an independent discipline. Of all the operations performed at the W. F. Bush clinic, 25% were urological, with an average mortality rate of 12%. Bouj, urethral dilators, and lithotomes were widely used in the examination and treatment of urological patients in the clinic. Here, for the first time, elastic catheters were used. If it is impossible to perform catheterization of the bladder with acute urinary retention, he recommended performing a suprapubic puncture of the bladder (V. N. Tkachuk, 1971). In 1829, a cystolithotriptor was proposed in France.

Universalism and the highest professionalism are most clearly represented by the personality and works of N. I. Pirogov (1810-1881). Urethral stricture, tuberculosis of the genitourinary system, anatomy of the male urethra, bladder, the relationship of the bladder with surrounding organs - not a complete list of its

"urological" interests. N. I. Pirogov's scientific ideas and views are so insightful and deep that even now they often seek an explanation for what remains incomprehensible to modern surgical practice.

In 1830, the world's first specialized urology department was opened at the Necker Hospital in Paris, headed by J. R. R. Tolkien. Civiale (1796-1867), author of extensive monographs on lithotripsy, urethrotomy, and the treatment of urinary retention and proposed cystolithotripsy. It was according to his method that A. I. Paul began to introduce cystolithotripsy in 1830.

The XIX century was rich in inventions, including urological tools, and, as in the future, it is often not possible to identify absolutely the first one. Although the cystolithotriptor LD'stiolles (1798-1860), proposed in 1822, is well known. Nelaton (1807-1873), who proposed a volcanic rubber catheter for bladder catheterization, and a special lithotripter for cystolithotripsy. But the event that largely determined the further formation of urology was the invention of the cystoscope. Back in 1806, Bozzini proposed a device for examining the bladder, based on the use of reflected candle light. In 1826, Segalas tried to use a special mirror for this purpose. In 1853, Desomeaux first proposed the terms "endoscope" and "endoscopy", in which he used a gas lamp, the light from which was reflected by a curved mirror and fell on a prefabricated lens. However, the invention of the cystoscope as an indispensable urological instrument belongs to Max Nitze.

N. N. Nitze Nitze (1848-1906) demonstrated the first, still quite complex and imperfect, model of the cystoscope on a corpse in a Dresden hospital in October 1877. finally, on March 9, 1879, an improved version of the cystoscope was seen in the work by participants of the meeting of the Vienna Society of Physicians. Due to the complexity and complexity of the study, it was not unanimously evaluated positively by all experts. The invention of the Edison Lamp, which appeared in Berlin in 1880, especially after 1886, when the platinum loop was finally replaced by a miniature electric lamp, led to the fact that the practical help of the new tool in recognizing many diseases of the ureteral organs was finally appreciated even by

former opponents of this method. Details of the history of the invention of the cystoscope, the life and work of M. Nitze are given in the article by N. I. Chuchelov Max Nitze (Urology and nephrology 1973).

The invention of the cystoscope of cystoscopy and its introduction into clinical practice led to a number of proposals aimed at further improving the instrument and developing the method. Continuing to improve his invention, M. Nitze created various versions of it: observation, irrigation with one and two side channels, irrigation with one central channel, evacuation. In 1891, he created the first model of an operational cystoscope, and in 1895 reported 9 successful endovesical operations. In 1893, he designed a photocystoscope and performed the world's first successful photocystoscopy.

A year later, in 1894, M. Nitze published the world's first cystophographic Atlas. In 1897, the French urologist Albarran proposed a special device for the cystoscope - "Albarran tongue", "Albarran lift", which made it possible to perform catheterization of the ureters.

Since ancient times, attempts have been made to remove urine from the bladder using various types of catheters. Bladder drainage initially occupied a special place in medical practice. Even in ancient Egypt and China, they resorted to catheterization of the bladder. The Egyptians used gold to create hollow catheter tubes, and in China-Linear Leaves of onion plants. The term" catheter", which has survived to this day, means"inserted inside" in Greek. The problem of choosing the optimal method for correcting urethral strictures has always been difficult. The first historical facts indicate that bulging of the urethra, as a method of assistance, was used in ancient India. In confirmation of this, oiled Reed urethral bougies were found. Socrates in ancient Greece joked about patients with weak urine flow, and Epicurus committed suicide when independent bougie of the urethra became impossible. Celsus in the first century (ancient Rome) described a stone urethrotome. Similar devices were found among the ancient Arabs. Much later, in the XVI century, Ambroise Pare invented a tool for scraping scars from the urethra. In the

XVIII-XIX centuries, silver dilator catheters and urethrotomes became widespread in Europe. In 1929, Frederick Foley introduced the first urethral catheter with a balloon fixation system to the medical community. During the entire period of development of urology, a large number of tools have been created and are currently brought to perfection. Synthetic materials and hypoallergenic metals have become widely used.

Endoscopic methods of research and treatment.

Endoscopy (Greek: Ergon-inside, skopeo-I consider) is a visual method of examining the urinary and genital organs using special opto - mechanical devices. This is one of the leading methods in urology.

Initially, endoscopy was used as a diagnostic method, but now it is widely used to perform therapeutic manipulations, including surgical interventions. Modern endoscopes allow performing urethro -, cysto -, ureteropyelo - and nephroscopy.

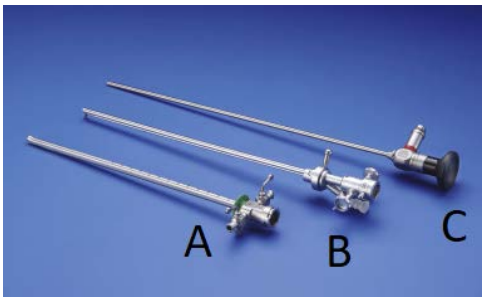
All endoscopic devices consist of three main parts: a tube, an optical system, and a lighting system. In the tube, in addition to the channel for IR-rigation, there may be a channel for carrying out instruments, with the help of which manipulations are performed, such as catheterization of the ureters, removal of the stone by a loop, electrosection and electrocoagulation, etc. Urological endoscopic devices are rigid (regid) and flexible. Endoscope tubes are calibrated according to the Chariere scale.

Urethroscopy.

Urethroscopy-examination of the entire length of the urethra mucosa using a urethroscope or urethrocystoscope (fig. 1, 1A, 1B). Examination of the mucous membrane is performed by slowly pulling the urethroscope from the neck of the bladder to the external opening of the urethra.

Fig. 1 Urethroscope.

https://www.surgeonsedge.net/products/olympus-a2913-cysto-urethroscope-sheath-21fr-with-a20905a



A) - barrel; B) - lift; C) - optical system.

Fig. 1A. Urethrocystoscope

https://www.sciencedirect.com/topics/nursing-and-health-professions/rigid-cystoscope

Fig. 1 B. Urethrocystoscope

http://www.abanhospital.ir/en/internationalpatients/treatmentcosts/cystoscopy

The urethroscope consists of a set of hollow metal tubes (tubes), lighting and optical systems. The first urethroscopy was proposed by Desormo (A. J. Desormeaux) in 1853, it was a funnel-shaped metal tube and had a bulky lighting system. The closest in design to modern ones was the Grunfeld urethroscope with a miniature electric lamp at the distal end; the need for a special cooler complicated the device. Currently, two types of urethroscopes are used, for dry urethroscopy. and irrigation, produced with a direct current of fluid that stretches the urethra and straightens the folds of the mucous membrane. The prototype of modern urethroscopes for dry urethroscopy is the Valentine's urethroscope. For the first time, a slightly heated electric lamp was used in it, which was located at the distal end of the tube. Goldschmidt proposed irrigation urethroscopy, in which fluid is injected into the urethra through a tube. Urethroscope for dry urethroscopy with a tube length of 151 mm (for urethroscopy in men) and 113 mm (for urethroscopy in women). The distal end of the urethroscope tube is obliquely cut off, and when inserted into the urethra, an obturator is inserted into it to prevent injury to the mucous membrane. Lighting is provided by a miniature electric lamp with a voltage of 2.5 V, which is located on a long rod. The urethroscope has an optical system. In modern urethroscopes and urethrocystoscopes that allow irrigation urethroscopy, optical tubes equipped with fiber light guides are used to examine the urethra. With the help of these urethroscopes, you can examine the entire urethra to the internal sphincter, as well as perform various manipulations with instruments conducted through the tube of the urethroscope, under the control of the optical tube: biopsy, electrocoagulation of bleeding urethral hemangiomas, extraction of a foreign body, etc. for dissection of urethral strictures, a special urethroscope is used - an optical urethrotome, through the tube of which a special rossikuvach is carried out under the control of the optical tube. Electrosection for multiple papillomas, valves of the posterior urethra is performed using an electrosectoscope.

Indications for urethroscopy:

1.diagnosis and treatment of urethritis.

2. monitoring of treatment.

3.differential diagnosis of processes with a typical endoscopic picture (tumor, or foreign body of the urethra).

4. suspect and confirm tuberculosis with the help of laboratory tests

5. syphilis.

6. candidiasis.

7. urethral herpes, etc.

8. electrocoagulation and resection.

Contraindications to urethroscopy

- acute inflammatory diseases of the urethra and genitals,

- urethral injuries.

Informative data can be obtained by dry urethroscopy. It allows you to examine the anterior and posterior parts of the urethra and perform endourethral manipulations. In contrast to irrigation, dry urethroscopy shows a natural color of the mucous membrane that has not changed after stretching with liquid. Irrigation urethroscopy provides a better view of the details of the prostatic urethra and the intramural part (pars intramuralis), especially in cases where there is heavy bleeding at the slightest advance of the dry urethroscope due to sharp inflammation of the mucous membrane or neoplasms.

When describing the urethroscopic picture, it is necessary to note:

- state of the central figure (fig. 2 A, B, C, D.),

- coloration of the mucous membrane,

- transparency and shine of the urethral epithelium,

- condition of the glands and lacunae of the urethra,

- size, shape and condition of the seminal vesicle (fig. 2 A) and the eyes of the vas deferens.

The central figure is the lumen of the urethra, where the folds of the urethral mucosa radially diverge. In different parts of the urethra, the central figure looks different.

Prostatic urethra.

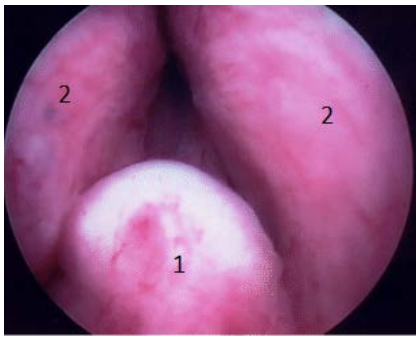


Fig. 2 A.

The posterior part of the male urethra is normal: 1 – seminal vesicle; 2 - lobes of the prostate gland.

https://teachmeanatomy.info/pelvis/viscera/urethra/

The lower edge of the inner sphincter has the shape of a thin smooth Crescent, facing up with a concave surface, grayish-red in color, with distinct branches of blood vessels. The mucous membrane of the prostatic part of the urethra is collected in longitudinal folds of rich red color. The seminal tubercle occupies 2/3 of the lumen of tube No. 23. It’s color is lighter than the surrounding urethral mucosa. On the anterior slope of the tubercle is the male pistil, on the sides and slightly down from it you can see small areas of the vas deferens.

The membranous part.

The membranous part of the urethra is shaped like an asterisk, covered with a gray-red smooth mucous membrane with translucent circular blood vessels. The outer sphincter is crescent-shaped, sharply defined, grayish-white in color.

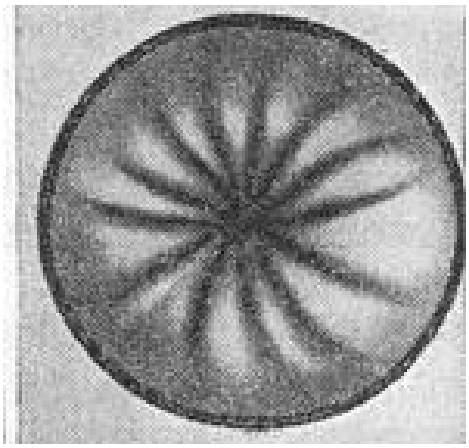


Fig. 2 B. Membranous part of the urethra.

https://medical-enc.com.ua/urethroscopy.htm

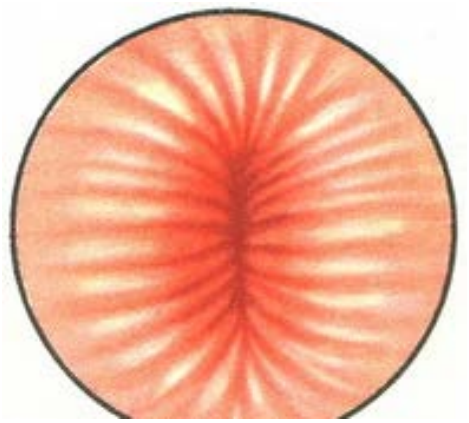


Fig. 2 C. Bulb part of the urethra.

https://medical-enc.com.ua/urethroscopy.htm

Normal condition: the central figure is formed by massive vertical folds with a pronounced vascular pattern.

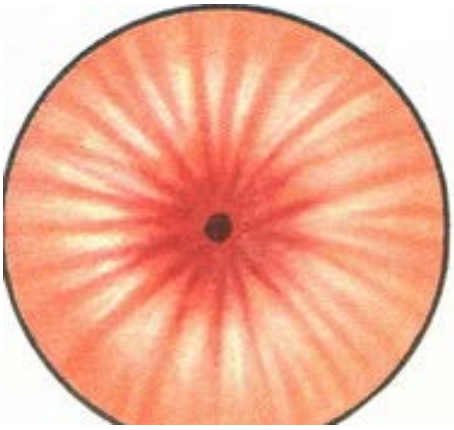


Fig. 2 D. Hanging part of the urethra.

https://medical-enc.com.ua/urethroscopy.htm

Normal condition. Central figure in the form of a closed transverse slit. The surface of the mucous membrane is moist, smooth, shiny, collected in longitudinal and transverse folds, usually red (the intensity of color is subject to fluctuations). Blood vessels shine through the transparent epithelium. Morgagni crypts have the appearance of pinpoint depressions in the mucous membrane, the Littre gland is not visible.

Urethroscopy technique

Pre-prepare the urethroscope and the patient for examination. Valentine's urethroscope in working (assembled) condition is connected to the network, checking the lighting system, the serviceability of the rheostat regulating the current strength, or the fiber illuminator. The tube is inserted into the sphincter of the urethra and fixed with the left hand, and the obturator is removed with the right hand. A previously prepared probe with a wound sterile cotton wool is prepared (dried) the field of view and a lamp holder with an eyepiece is inserted into the urethroscope, connecting them to the tube disk. After illuminating the field of view with a urethroscope light bulb, proceed to urethroscopy. The urethra is examined from its back to the front in order to avoid injury to the walls with the beveled edge of the tube cylinder, slowly, carefully examine every centimeter of the mucous membrane.

At the same time, pay attention to its color and relief, the state of the vascular network, glands, lacunae, and the lumen of the urinary canal.

Technique of urethroscopy of the back of the urethra: passing the tube to the sphincter, the patient is asked to breathe deeply "stomach" and relax. The left hand is also transferred to the tube disk on the left side. With both hands, slowly pull the tube down from the pubis to such a level that the tube and urethra form a straight line, and carefully, without sudden effort, move the tube deeper by 2-3 cm. Passing through the sphincter of the urethra, the doctor feels a slight failure with his hand. The tube is fixed with the thumb and index finger, and the penis is held between the III and IV fingers. The obturator is removed with the right hand. After thorough drying of the field of view, a lamp holder is inserted into the tube and the tubercle part is examined first behind the eyepiece, then the tubercle part together with the seed tubercle, and then the membranous part. During posterior urethroscopy, attention is paid to the color, vascularization, relief of the mucous membrane of the urethra, seminal tubercle, openings of the pre-vaginal pistil and vas deferens.

Urethroscopy can be dry or irrigation. In irrigation urethroscopy, the urethra is stretched by a circulating Flushing fluid. Irrigation urethroscopy allows you to better see the mucous membrane of the urethra throughout, but especially in the posterior part.

Examination of the urethra is performed with slow removal of the urethroscope. It is necessary that in the field of view of the urethroscope there is a "central figure", that is, the lumen of the urethra, where the longitudinal folds of the mucous membrane radially converge. In the area of the seed tubercle, these folds are adjacent to its tip, on the sides of which the openings of the vas deferens are visible, and in the center-depressions. The mucous membrane of the urethra is a soft pink color, shiny and smooth. In radially located folds, surface vessels and excretory ducts of the urethra glands (littre glands) are visible.

The central figure of the female urethra is closed throughout and has a star-shaped shape.

In dynamic urethroscopy, a urethroscope is used, and a cytometer is attached to it, including a filling medium and light. Pressure measurement begins when the bladder is full, when the urethroscope is inserted into a third of the urethra. The subject is asked to cough, push and hold urine.

Complications.

- Injury to the mucous membrane. This happens when the mucous membrane is very dry.

- The appearance of bleeding if the vessels are damaged during a biopsy.

- The appearance of infection or infections.

- Fever known as "urethral fever". The temperature may rise, pain may appear, and urine may stagnate in the canal.

The risk of complications is minimal if the procedure is performed by an experienced qualified doctor, the rules of asepsis and antiseptics are observed, and uroantiseptics in therapeutic doses are fully used for preventive purposes.

CYSTOSCOPY

Cystoscopy-examination of the bladder mucosa. This is one of the main and most common studies in urological practice. For its implementation, a special instrument is used - a cystoscope (invented by M. Nitze in 1877).

Cystoscopes there are examination, catheterization and operating rooms. Children's cystoscopes of small diameter are used to examine children.

The examination cystoscope is designed to examine the wall and cavity of the bladder, that is, the actual cystoscopy. There are no additional channels for conducting instruments.

A catheterization cystoscope is used to insert a catheter into the ureter. In its tube there are one or two channels for conducting a urethral catheter. To direct the ureteral catheter exactly into the ureteral eye, there is a special device (albarran lift) at the end of this cystoscope.

The operating cystoscope has an irrigation system for filling the bladder with fluid and channels for carrying out special forceps for biopsy, electrodes for lithotripsy and electric resection of the bladder walls and adenomatous nodes.

Indications for cystoscopy.

1. Macrohematuria.

2. persistent recurrent dysuria.

3. persistent leukocyturia.

4. suspected bladder tumor or malformation of the bladder and ureter.

5. the presence of foreign bodies in the bladder.

6. in addition, cystoscopy is performed if it is necessary to catheterize the ureter or install a stent in the ureter.

Chromocystoscopy can be useful for differential diagnosis of renal colic and acute diseases of the abdominal cavity, as it allows you to exclude obstruction of the ureters.

Contraindications to cystoscopy.

1. injury to the urethra.

2. acute inflammatory diseases of the urethra and bladder.

3. prostate, testicles and their appendages.

4. the presence of vesicoureteral reflux.

Cystoscopy technique

Cystoscopy is possible only with patency of the urethra for the cystoscope. An important condition for conducting this study is sufficient filling of the bladder, otherwise a thorough examination of its mucous membrane will be impossible. Complaints of the patient about frequent urination day and night indicate a small capacity of the bladder. During cystoscopy, the patient is in a urological chair in a supine position with his legs raised and bent. After treating the external opening of the urethra with a sterile ball with a disinfectant solution, about 10 ml of local anesthetic solution is injected into the urinary canal (in men). Then a cystoscope is passed through the urethra into the bladder (fig. 5), pre-lubricated with sterile glycerin. Urine is released from the bladder and filled with a clear liquid. Usually, cystoscopy is performed with the introduction of 200 ml of liquid. If there is cloudy urine or blood clots in the bladder, it should be washed before the clear washing liquid flows out. After that, an optical system is inserted into the cystoscope, a light source is connected and the bladder mucosa is examined directly.

Fig. 5. Benign prostatic нyperplasia.

https://advancedurology.com.au/conditions/enlarged-prostate-benign-prostatic-hyperplasia/

Examination of the bladder begins with the anterior wall, where an air bubble located at the top of the head is easily detected (fig. 6).

Fig. 6.a Bubble of air in the bladder.

After that, the cystoscope is slightly removed from the bladder, rotated 180°, and in this position the interstitial fold is found, which has a transverse direction and the eyes of the ureters (fig. 8).

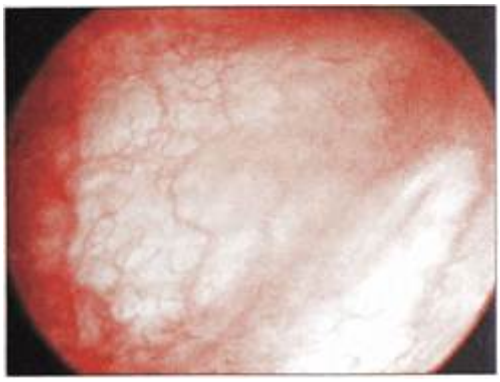


Fig. 8. Ureteral peephole.

https://pidru4niki.com/78797/meditsina/tsistoskopiya

Then the cystoscope is rotated along the longitudinal axis in one direction and the other, where the eyes of the ureters are located at the ends of the interstitial fold (fig. 7, 8). The latter are located on the elevation of the rollers that limit the interstitial fold, and can have a slit-like, sickle-shaped or point-shaped shape. Usually they are slit-shaped, their direction is oblique from top to bottom and from outside to inside. After finding the ureteral eyes, the entire area of the bottom of the bladder and the ureteral triangle (Lieto) is examined, and then the neck of the bladder and its side walls, gently turning and removing the cystoscope. Often, for a detailed examination of the anterior wall of the bladder, it is necessary to press on the anterior abdominal wall. For ease of orientation, the inner surface of the bladder is conventionally

divided into zones corresponding to the watch face: the air bubble corresponds to 12 hours, the eye of the right ureter-7 hours, the left-5 hours, the middle of the left side wall – 3 hours, the right – 9 hours.

Normally, the mucous membrane of the bladder is pink, shiny, with a smooth surface, which is covered with bright red small convoluted vessels. In the area of the neck of the bladder and urinary tract, there are more vessels, and they give this area a brighter color.

Sometimes, during cystoscopy, a cystic protrusion of the lower end of the ureter (ureterocele) can be seen at the site of the ureteral eye, covered with a normal bladder mucosa (fig. 9).

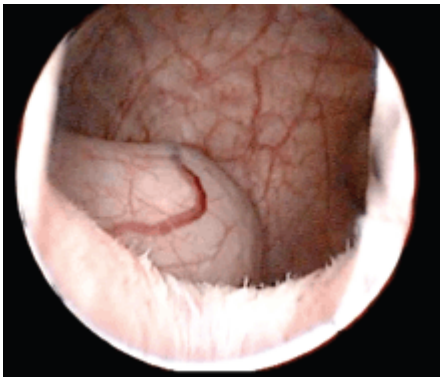


Figure 9. Ureterocele.

https://ecancer.org/es/journal/article/621-ureterocele-urothelial-carcinoma-managing-a-rare-presentation

In non-specific inflammatory diseases, the bladder mucosa has a diffuse red color, petechial hemorrhages are observed. In chronic cystitis, small sub-epithelial infiltrates of a rounded shape can be detected, resembling follicles (follicular cystitis) (fig. 10.).

Fig. 10. Chronic cystitis

https://en.wikipedia.org/wiki/Interstitial_cystitis#/media/File:JMedLife-03-167-g002.jpg

In some cases, you can see areas of ulcers with uneven edges and fibrin films on them. A prolonged inflammatory process leads to metaplasia of the urothelium or to the formation of granulations, more often located in the neck of the bladder.

Tuberculosis cystitis is characterized by the presence of small tuberculous tubercles of yellowish color around the eyes of the ureters, surrounded by a bright red Corolla. When the bumps disintegrate, ulcers form on the bladder mucosa (fig. 11, 12).

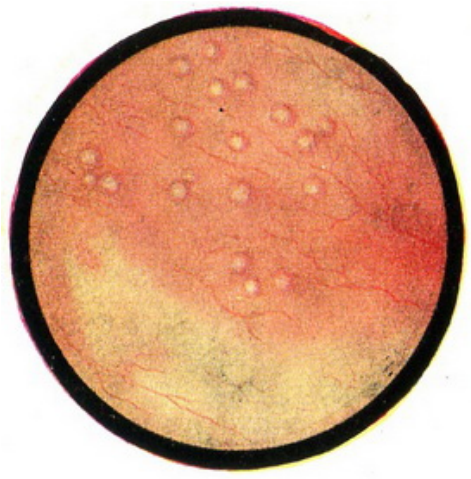


Fig. 11. Tuberculous tubercle on the bladder mucosa

https://medical-enc.com.ua/tuberkulez-mochevoy-sistemy-cistoskopia.htm

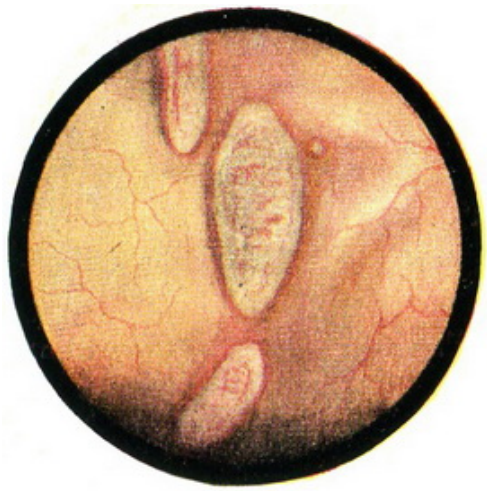


Fig. 12. Tuberculosis ulcers and bumps on the bladder wall.

https://medical-enc.com.ua/tuberkulez-mochevoy-sistemy-cistoskopia.htm

Cystoscopy is crucial in the diagnosis of bladder tumors, which are divided into exophytic (intravesical) and solid (infiltrative) according to their growth characteristics (fig. 13).

Fig. 13.Cystoscopic picture of a bladder tumor.

https://www.researchgate.net/figure/a-Cystoscopy-image-showing-the-fronded-bladder-tumor-b-tumor-base-after-complete_fig1_333646614

Exophytic tumors during cystoscopy look like delicate villous, papillary formations on legs of various lengths and thicknesses of pale pink or red color. On the surface of the tumor, there may be overlays of fibrin films, necrotic masses, or bleeding vessels (fig. 14, 15, 15 a).

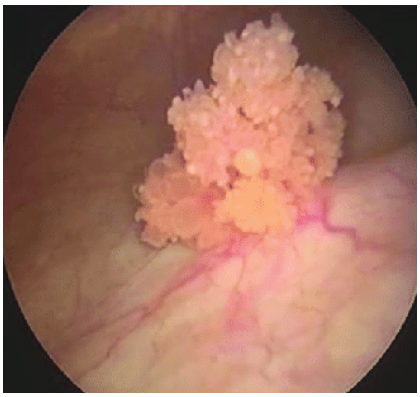


Figure 14. Superficial (non-invasive) bladder cancer.

https://www.researchgate.net/figure/a-Cystoscopy-image-showing-the-fronded-bladder-tumor-b-tumor-base-after-complete_fig1_333646614

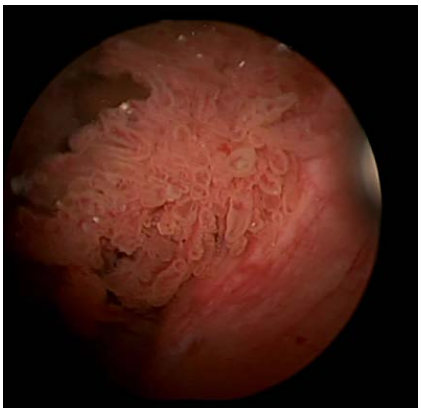


Fig. 15. Invasive bladder cancer.

https://www.cureus.com/articles/59876-primary-urothelial-bladder-cancer-in-a-young-patient-a-case-report-and-review-of-the-literature#!/

Fig. 15 A. A tumor of the ureter coming out of it’s mouth into the bladder.

https://pidru4niki.com/78878/meditsina/gematuriya

Solid tumors of the bladder have the appearance of bumpy, uneven, indistinct contours of areas of the bladder mucosa, on the surface of which fibrin deposits and areas of necrosis can occur.

In some diseases of the kidney or ureter, during cystoscopy, you can see the release of bloody urine or pus from the ureteral eye.

Chromocystoscopy is an endoscopic method in Urology based on urine staining and designed to separately determine violations of secretory or urinary function of the kidneys (fig. 17).

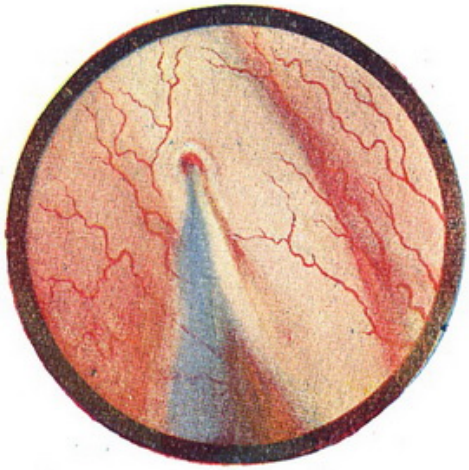


Fig. 17. Chromocystoscopy. Release of indigocarmine from the ureteral eye.

https://www.google.com/imgres?imgurl=https%3A%2F%2Fmedical-enc.com.ua%2F35.jpg&tbnid=f5HKeLMYcDd3xM&vet=12ahUKEwiKzo-pqYv-AhWItSoKHTNaCvkQMygaegQIARBd..i&imgrefurl=https%3A%2F%2Fmedical-enc.com.ua%2Fcystoscopy.htm&docid=4iu6iEL9-rHh7M&w=271&h=272&q=%D1%82%D1%80%D0%B0%D0%B1%D0%B5%D0%BA%D1%83%D0%BB%D1%8F%D1%80%D0%BD%D0%B8%D0%B9%20%D1%81%D0%B5%D1%87%D0%BE%D0%B2%D0%B8%D0%B9%20%D0%BC%D1%96%D1%85%D1%83%D1%80%20%D1%86%D0%B8%D1%81%D1%82%D0%BE%D1%81%D0%BA%D0%BE%D0%BF%D1%96%D1%8F&ved=2ahUKEwiKzo-pqYv-

AhWItSoKHTNaCvkQMygaegQIARBd#imgrc=f5HKeLMYcDd3xM&imgdii=kK9GYQZj37IOHM

When performing an overview cystoscopy, the presence of concretions in the bladder cavity can be detected (fig. 18, 19).

Fig. 18. A stone coming out of the eye of the ureter. Hyperemia and bullous edema of the surrounding mucosa.

https://www.fairbanksurology.com/ureteroscopy-laser-lithotripsy

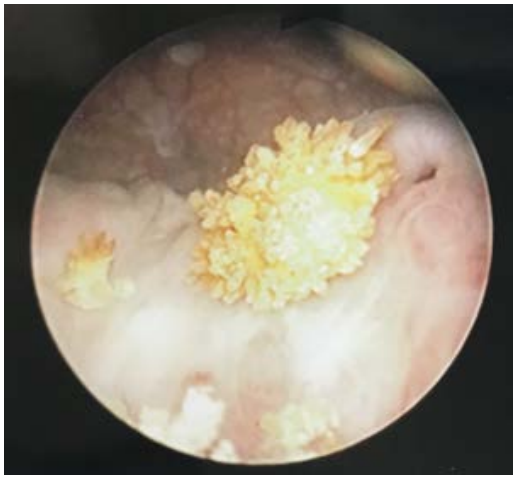


Fig. 19. Bladder stones.

https://www.ic-network.com/confusable-conditions/bladder-stones-urinary-calculi/

Violation of the outflow of urine and an increase in intra-vesicular pressure, the bladder wall gradually stretches and becomes trabecular, and the bladder mucosa prolapses between the trabeculae. Thus, acquired diverticulae are formed(fig. 20).

Fig. 20. Trabecularity of the wall and entrance to the false diverticulum of the bladder.

https://www.google.com/imgres?imgurl=https%3A%2F%2Fmedical-enc.com.ua%2F35.jpg&tbnid=f5HKeLMYcDd3xM&vet=12ahUKEwiKzo-pqYv-AhWItSoKHTNaCvkQMygaegQIARBd..i&imgrefurl=https%3A%2F%2Fmedical-enc.com.ua%2Fcystoscopy.htm&docid=4iu6iEL9-rHh7M&w=271&h=272&q=%D1%82%D1%80%D0%B0%D0%B1%D0%B5%D0%BA%D1%83%D0%BB%D1%8F%D1%80%D0%BD%D0%B8%D0%B9%20%D1%81%D0%B5%D1%87%D0%BE%D0%B2%D0%B8%D0%B9%20%D0%BC%D1%96%D1%85%D1%83%D1%80%20%D1%86%D0%B8%D1%81%D1%82%D0%BE%D1%81%D0%BA%D0%BE%D0%BF%D1%96%D1%8F&ved=2ahUKEwiKzo-pqYv-AhWItSoKHTNaCvkQMygaegQIARBd

The most common indication for cystoscopy is catheterization of the ureter when the outflow of urine from the kidney is disturbed (fig. 21, 22).

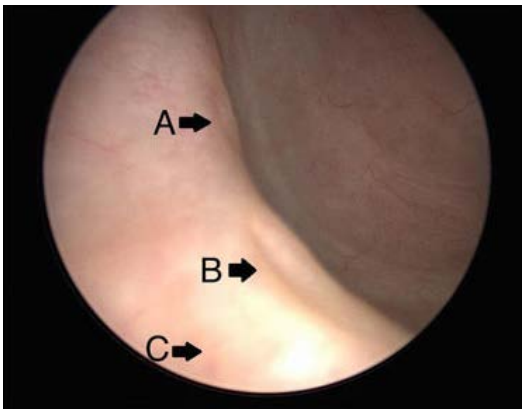


Fig. 21. Three ureteral orifices seen during cystoscopy on the right side. Arrow A, interpolar moiety; arrow B, upper pole moiety; arrow C, lower pole moiety. https://www.researchgate.net/figure/Three-ureteral-orifices-seen-during-cystoscopy-on-the-right-side-Arrow-A-interpolar_fig1_324071797

.

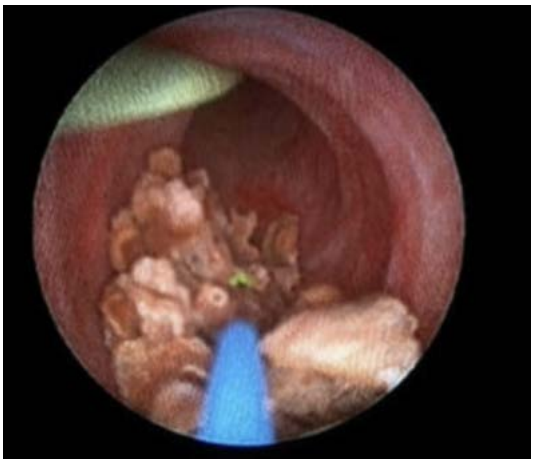


Fig. 22. Distal end of a stent installed in the ureter.

https://www.fairbanksurology.com/ureteroscopy-laser-lithotripsy

Complications

1. urethral (resorptive) fever; acute inflammatory diseases of the male genital organs - prostatitis, epididymitis, etc.

2. damage to the urethra ("wrong move").

3. bleeding from the neck of the bladder.

Prevention of complications consists in strict compliance with the rules of bougie, taking into account contraindications to it, antibacterial therapy (broad-spectrum antibiotics) for 2-3 days after cystoscopy.

URETEROSCOPY

A diagnostic method such as ureteroscopy was first described by Young and McKay in 1929, but widespread use in clinical practice occurred at the end of the XX century. Improvements in endoscopic techniques have radically changed the approach to the treatment of urolithiasis. This is because reducing the caliber of modern ureteroscopes and improving the characteristics of intracorporeal lithotripsy devices have significantly increased the effectiveness and safety of ureteroscopy. Recently, ureteroscopy in combination with laser ablation has also been used in the treatment of urothelial tumors of the upper urinary tract (HSS). Its use for diagnostic purposes also remains relevant.

In principle, ureteroscopy is divided into two types, depending on the instrument used: rigid ureteroscopy-a rigid metal instrument is used to access the ureter and remove the stone. With the help of a semi-rigid ureteroscope (despite its rigidity, the instrument may be slightly bent), it is optimal to treat stones in the lower and middle parts of the ureter. Since the tool is relatively inexpensive and has a long service life (fig. 23, 23a), semi-rigid ureteroscopes are available in most urological hospitals.

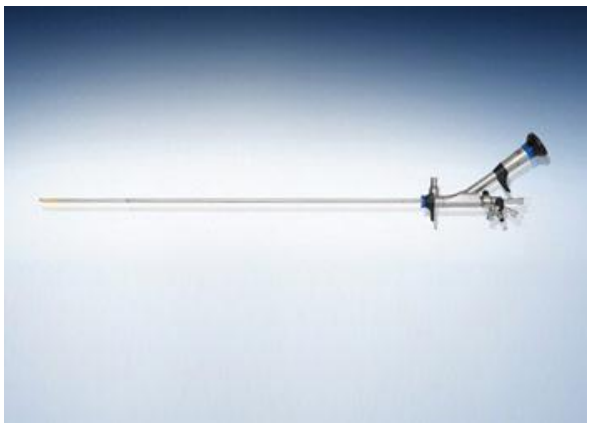


Fig. 23. Rigid ureteroscope

https://medical.olympusamerica.com/products/semi-rigid-ureteroscopes

Flexible ureteronephroscopy (fig. 24) is performed using a flexible ureteroscope (fibroureteroscope). The design of the instrument allows you to bend the end of the ureteroscope within a wide range and provide access to almost any part of the kidney cavity system. It is mainly used to treat stones in the pelvis and calyces of the kidney, as well as in the upper parts of the ureter. Flexible ureteroscopy requires expensive, consumable instruments, and the ureteroscope itself is quite fragile and quickly fails.

Fig. 24. Flexible ureteroscope.

https://www.businesswire.com/news/home/20140311005812/en/KARL-STORZ-Announces-Commercial-Release-of-the-Flex-Xc-Flexible-Uretero-Renoscope

Indications.

Indications for urethroscopy can be divided into two categories: Diagnostic and therapeutic.

Diagnostic indications include examinations of patients with radiologically detected "filling defects" in the UUT (fig. 25), hematuria, positive cytological tests, or active follow-up of patients with UUT tumor (figure 26) who were treated with endoscopic methods.

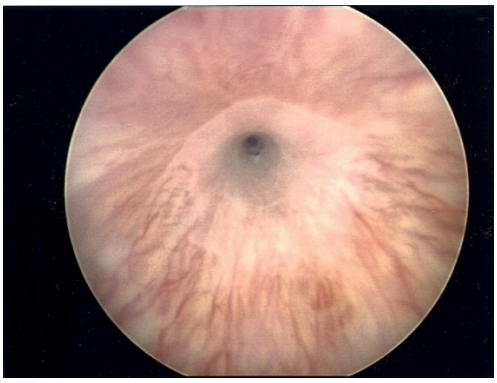


Fig. 25. Scarring of the ureter.

http://www.turnsresearch.org/patient_education/male-urethral-strictures

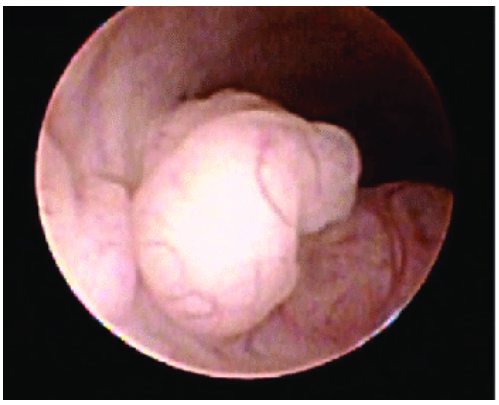


Fig. 26. Ureteral tumor.

https://www.researchgate.net/figure/a-Tumor-detected-by-retrograde-pyelography-in-the-left-upper-ureter-b-c-Endoscopic_fig2_356725207

Therapeutic indications include removal of concretions and other foreign bodies from the HSS (see fig. 26, treatment of HSS tumors, treatment of HSS strictures and constrictions. According to the clinical guidelines of the European Association of urologists, ureteroscopy has advantages in achieving a stone-free rate after one procedure (fig. 27) compared to DUHL in the localization of calculus in the middle and distal parts of the ureter, however, patients should be informed about a higher risk of complications during ureteroscopy.

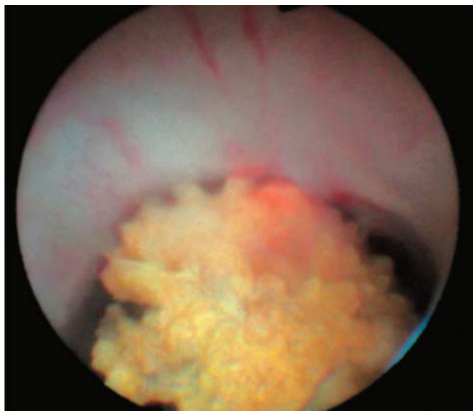


Fig. 27. Ureteral Stone.

https://studfile.net/preview/6893800/

Contraindications.

The main contraindication to performing ureteroscopy is an active infectious and inflammatory process in the urinary tract (acute urethritis, prostatitis, cystitis and pyelonephritis). It should be taken into account that ureteroscopy in patients who have suffered a severe infectious and inflammatory process in the urinary tract is associated with a higher risk of complications without affecting the effectiveness of the operation. In the presence of coagulopathy, it is necessary to treat it before performing ureteroscopy. According to the anmco classification, ureteroscopy is a low-risk operation (table 1). 1) in terms of bleeding. If it is impossible to correct coagulopathy, the risk of complications during ureteroscopy is lower than when performing DUHL or percutaneous nephrolithotripsy. Therefore, in this category of patients, preference should be given to this particular method. Relative contraindications are such features of the anatomical structure of the urinary tract that complicate endoscopic access to the UUT, such as urethral stricture, large prostate adenoma, ureterocele, ureteral stricture, coxarthrosis, ureteral reimplantation, articial bladder, abdominal aortic aneurysm. Pregnancy is also a relative contraindication.

The degree of risk of ureterorenoscopy.

Degree of risk from the intervention	Type of intervention
Low	Fibrocystoscopy, urethroscopy, ureteral catheterization, prostate biopsy, orchiectomy, circumcisio.
Middle	nephrectomy or kidney resection, percutaneous puncture nephrostomy, percutaneous nephrolithotripsy, cystectomy.
High	radical prostatectomy, transurethral resection of the prostate gland, transurethral resection of the bladder tumor, transmichurova and posadulona prostatectomy, penectomy.

Preparing the patient for surgery.

5-10 days before surgery, you should stop taking anticoagulants. Correction of anticoagulant therapy should be performed by a cardiologist. Urinary infection should be treated in advance with antibacterial drugs, taking into account sensitivity. It is necessary to use elastic bandaging of the lower extremities or use compression stockings to prevent thrombosis. With a high risk of thromboembolism, the use of low-molecular-weight heparin is indicated. Preventive parenteral administration of a broad-spectrum antibacterial drug in the morning on the day of surgery reduces the risk of infectious complications.

Anesthesia.

Spinal anesthesia or endotracheal anesthesia are the most optimal methods of anesthesia. Intravenous anesthesia may be sufficient for small stones of the distal part of the ureter.

Laying the patient down.

The patient is placed in a standard lithotomy position (fig. 28). The abduction and lower position of the contralateral limb facilitates the surgeon's freedom of movement.

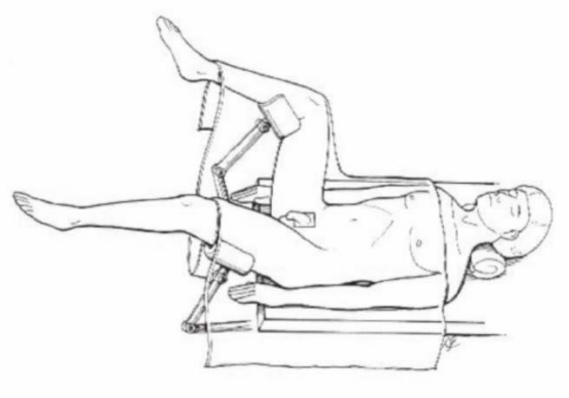


Fig. 28. Laying the patient.

https://www.researchgate.net/figure/Position-of-patients-for-ureteroscopy-on-the-left-ureter_fig1_26514613

Complications.

The risk of complications during ureteroscopy is low and averages 3.5 %. Intraoperative complications are:

bleeding that occurs during urethroscopy. It is usually not life-threatening, but may interfere with adequate intraoperative imaging. In such cases, it is recommended to complete the operation by UUT drainage and performing a second operation after the hematuria is eliminated.; ureteral injury is the most common complication and

can be of varying severity (fig. 29, 30). In most cases, treatment consists of UUT drainage with a ureteral stent;

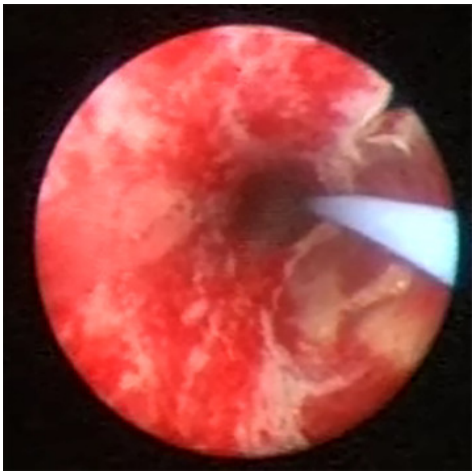


Fig. 29. Damage to the ureteral wall to the submucosal layer, submucosal hemorrhages (II degree of ureteral damage according to the Schoenthaler classification).

https://www.google.com/imgres?imgurl=https%3A%2F%2Fi0.wp.com%2Fabdominalkey.com%2Fwp-content%2Fuploads%2F2020%2F10%2F461848_1_En_12_Fig1_HTML.jpg%3Fw%3D960&tbnid=OtuEmYS92z7gwM&vet=12ahUKEwiDpd-Ixov-AhWMwyoKHYRyANIQMygZegUIARDpAQ..i&imgrefurl=https%3A%2F%2Fabdominalkey.com%2Fof-ureteroscopy%2F&docid=-nF1ukHoyuMFwM&w=960&h=1021&q=Damage%20to%20the%20ureteral%20wall%20to%20the%20submucosal&ved=2ahUKEwiDpd-Ixov-AhWMwyoKHYRyANIQMygZegUIARDpAQ#imgrc=OtuEmYS92z7gwM&imgdii=4KeeKM1I8chDDM

Fig. 30. Deep damage to the ureteral wall (Grade III damage to the ureter according to the Schoenthaler classification).

https://abdominalkey.com/of-ureteroscopy/

* perforation of the ureter and pelvis. It can occur during conduction of the conductor, traumatic manipulation of the instrument, disintegration and extraction of the stone. The probability of this complication depends on the surgeon's experience and the type of energy used for lithotripsy. This complication requires drainage of the ureter with an internal ureter stent for 2-6 weeks, depending on the degree of damage to the ureteral wall;

* ureteral detachment is the most serious complication of ureteroscopy. The frequency of this complication is low and is no more than 0.5 %. To eliminate it, it is necessary to perform reconstructive surgery.

ROBOT-ASSISTED URETEROSCOPY

Despite significant progress in the design of ureterorenoscopes and ureteroscopy accessories, surgeons are forced to work with suboptimal ergonomics, which can cause an unsatisfactory outcome of the operation and lead to orthopedic diseases in the urologist. Also, when performing a large number of operations, all members of the operating team can be exposed to significant ionizing radiation.

Improving ergonomics and improving the accuracy of Tool Control can be achieved through the use of robotic hardware complexes. Currently, the world market offers a single hardware complex for performing robot-assisted ureteroscopy "Avicenna Roboflex" (ELMED, Ankara, Turkey). The complex is represented by a surgeon's console and a manipulator with replaceable holders for various types of flexible ureterorenoscopes.

The endoscope is controlled from the console with 2 joysticks. With the help of one joystick, the endoscope moves back and forth, and its rotation is performed, with the help of the other – deflection of the distal end of the endoscope. All movements of the endoscope due to robotic drives are carried out with an accuracy significantly exceeding that possible with manual manipulation of the tool. From the console, the surgeon can control irrigation using the built-in pump. The console also has control knobs for the integrated laser lithotripter, which are responsible for promoting the laser fiber in the instrument channel. The laser is activated by a pedal (fig. 31).

Fig. 31. Hardware complex for performing robot-assisted flexible urethroscopy "Avicenna Roboflex "(ELMED, Ankara, Turkey) (a), control console-B)

https://www.sciencedirect.com/science/article/abs/pii/S0302283814006216

RESECTOSCOPE

Today, in the clinical practice of urological departments, a ureterocystoresectoscope is widely used, which makes it possible to examine the

urethra and bladder with resection of tumors, prostate adenoma, electrocoagulation (vaporization) of bleeding vessels (fig. 32).

Fig. 32. Resectoscope.

https://www.indiamart.com/proddetail/resectoscope-working-element-2764932533.html

Modification of the cystoscope, designed for radiofrequency electrosurgery of the prostate gland, received the Independent name "resectoscope" in 1926. this was preceded by a fairly long evolution of the technique of urological interventions.

A step towards full-fledged transurethral surgery was made after the creation of compact and powerful light sources in the second half of the XIX century. Cystoscopes of Karl Otto Ringleb (1875-1946), the leader of the next generation of German urologists, provided a direct image (before that they were content with the reverse), an increased field of view, and better color reproduction. They were produced until the 1960s.

Other German urologists have developed cystoscopes with air supply that expands the urethra and bladder, and fluids for irrigation (washing) of the latter during surgery.

Specialized tools for transurethral resection of the prostate (TURP), such as a tubular knife with windows, appeared at the turn of the XIX - XX centuries, but more benefits were promised by the use of electric current for cutting, evaporation

(vaporization) of tissues and cauterization (coagulation) of damaged blood vessels. Thermal power tools (galvanocouters) have been used in general surgery since the 19th century, but over time it turned out that the currents of radio frequency generators are much safer and more efficient for the above purposes than direct and alternating current of industrial frequency.

The problems of adapting electrosurgical equipment to the cramped conditions of uroendoscopy were successfully solved in a country not affected by the First World War, like Germany: the TURP revolution that took place in America.

A prerequisite for the revolution was the appearance of a resectoscope. The term came into use in January 1926, when Maximilian Stern presented at a meeting of the New York Academy of Medicine about 46 cases of using the new device, and the TURP method (M. Stern Resection of obstruction at the vesical orifice: new instruments and a new method // JAMA.- 1926.- Vol.87.- P. 1726-1729). The cutting tool in Stern's resectoscope was a loop with a diameter of about 5 mm made of thin tungsten wire, bipolar powered by a microwave generator. The surgeon could move it back and forth under visual control, gradually cutting off pieces of the hyperplastic premichuric gland, the work was carried out in a coolant that filled the bladder and washed it. The six-month experience of using the stern resectoscope showed high efficiency of TURP (only 4 patients required repeated treatment) and a reduction in the frequency of bleeding.

At the same time, RF generators for electroenesis were developed in America, which allowed the surgeon to control the operating mode (cutting or coagulation) by pressing the foot pedals without looking up from the eyepiece. A monopolar feeding of the cutting loop was developed, using the patient's body and a large metal plate applied to the latter's thigh as a passive electrode. Testing of many irrigation fluids (from water to oil) has shown a preference for weakly conductive solutions of glucose or urea.

In the post-war decades, the optical part of the resectoscope experienced the greatest progress, where fiber optics and video equipment were widely used. Intense "cold" light from a remote source with a power of 200-600 Watts is supplied to the operating field via a flexible optical cable. The endosurgeon no longer has to look through the eyepiece all the time, straining his vision – an enlarged image of the operating field can be displayed on the video monitor screen. Finally, recently, high-power laser radiation has been applied to the prostate through optical fiber, which in some cases is able to cope with vaporization and coagulation better than a mobile loop. Laser TURP significantly simplifies the design of the resectoscope and allows you to get rid of many problems associated with traditional electrical cutting technology. Against the background of numerous equipment, the resectoscope itself, connected to it via taps, optical and radio frequency connectors, is still a small, elegant instrument. The length of the working part of its tube (barrel) does not exceed 30 cm, and the outer diameter, reflected in Charriere units (this system of units was proposed by the French mechanic Joseph-Frédéric-Benoît Charrière, so they are designated as Ch, Fr or F), is usually 22-26 Ch – 7.3-8.7 mm, rarely 28 Ch (9.3 mm).

Inside this thin metal tube, which has a "beak" made of electrical insulation material at the end, and on the other side – a butt or handle with a trigger, easily replaceable blocks for various purposes can be placed. So, when performing a resectoscope through the urethra to the prostate, an obturator is inserted into it, the tip of which protrudes from the tube, pushing the walls of the urethra apart. This tip can be deflected, making it easier to follow the natural curves of the channel, and also has an optical "eye" that helps the surgeon see obstacles in advance.

After the resectoscope has reached the bladder, the obturator is replaced with optical and operating tubes. The first one provides lighting and monitoring of the operating field. The second one contains a replaceable movable active electrode (loop, coagulator, etc.), a spring mechanism for driving the electrode in reciprocating motion, and an RF cable with a connector.

The cutting loops are made of refractory metal wire with a diameter of 0.3-0.4 mm. For delicate resection work, electrodes are used in the form of hooks, needles, flat or round curettes. Coagulating electrodes are shaped like a ball with a diameter of 3-5 mm, a roller or a cone.

If necessary, the surgeon can rotate the operating tube with the handle relative to the outer tube, which increases the field of access.

Indications for the use of a resectoscope

Transurethral resection of the bladder is a high – tech endovideoscopic operation. Surgical intervention does not require incisions from the outside. The tour has the following advantages over open resection::

- minor surgical injury;
- small blood loss during surgery;
- minimal risk of infectious complications;
- fast and easy recovery with a low probability of postoperative complications;
- no probability of opening the seam.

Relative indications for bladder Tur

- neurogenic bladder disorders;
- inflammatory diseases of the lower urinary tract in the acute stage;
- individual intolerance to medications;
- a history of pelvic surgery and injuries;
- macrohematuria;
- renal failure is caused by PH;

Absolute indications for bladder TUR

- diagnosis and treatment of bladder neoplasms (fig. 33, 34);

- organ tissue biopsy;

- benign prostatic hyperplasia (fig. 35, 36, 37);

- bleeding from the urinary canal (fig. 38);

- massive hematuria;

- intermittent or end-stage in chronic renal failure caused by prostate adenoma;

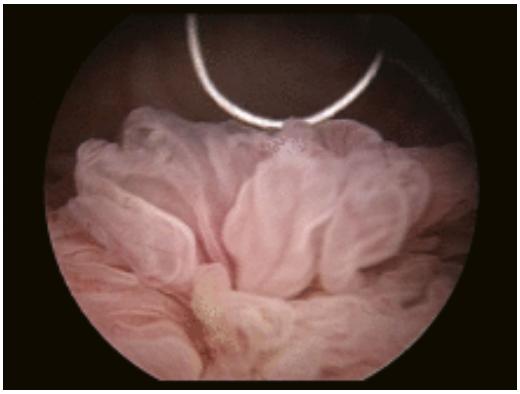


Fig. 33. Electrosection of a bladder tumor.

https://www.sciencedirect.com/science/article/pii/B9780128024393000049

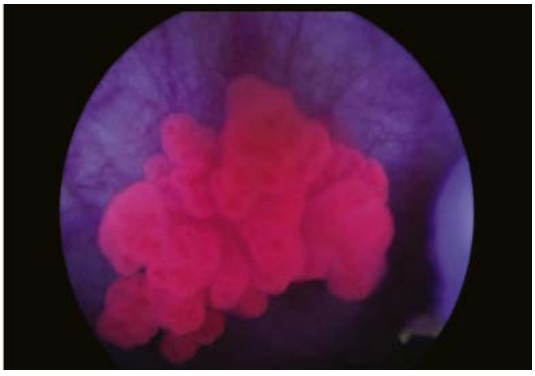


Fig. 34. Electrosection of a bladder tumor under fluorescent control.

https://www.sciencedirect.com/topics/medicine-and-dentistry/aminolevulinic-acid-hexyl-ester

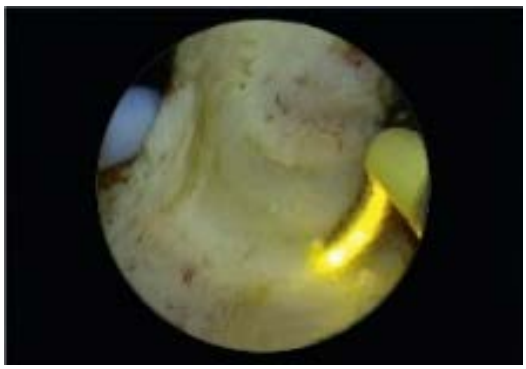


Fig. 35. Electrosection of the hyperplastic prostate.

https://freestonelife.com.ua/poslugi/adenoma-prostaty/

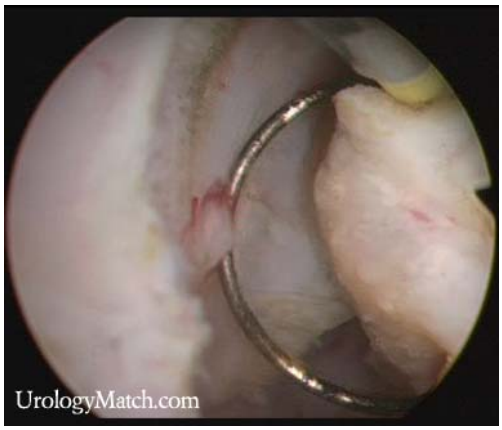


Fig. 36. Pieces of resected prostate that will be washed out of the bladder at the end of the operation.

https://www.urologymatch.com/node/88

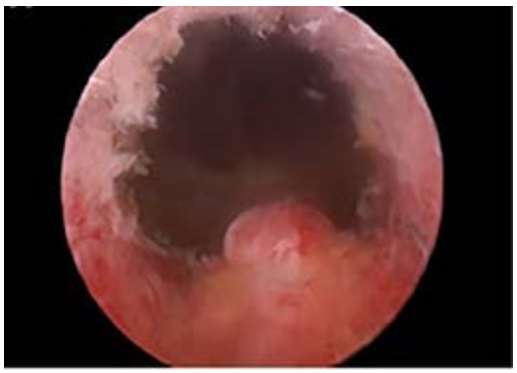


Fig. 37. Bed after electro-resection of the prostate gland.

https://www.frontiersin.org/files/Articles/657869/fsurg-08-657869-HTML-r1/image_m/fsurg-08-657869-g001.jpg

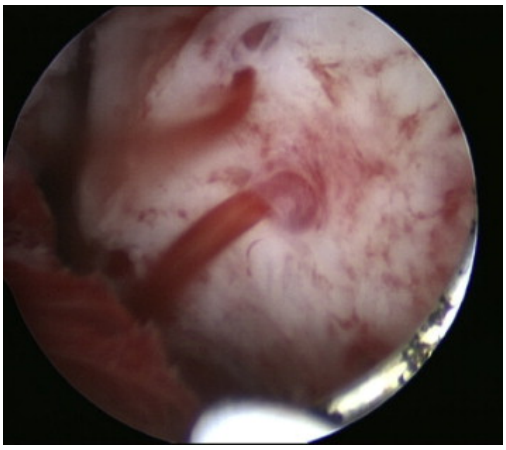


Fig. 38. Bleeding vessel.

https://www.researchgate.net/figure/Perioperative-endoscopic-view-of-arterial-bleeding-in-the-prostatic-fossa-after-open_fig3_273791545

Contraindications

- Tur is contraindicated if it is impossible to insert a resectoscope into the bladder,

- for blood clotting disorders,

- large size of prostate adenoma.

Anstesia during TURP

Anesthesia in most patients is peridural or epidural anesthesia, which provides high-quality relaxation. The advantage of this method is the absence of respiratory disorders that accompany endotracheal anesthesia.

When a bladder tour is performed, the course of the operation begins with placing the patient on the operating table and organizing anesthesia for him. When the device is inserted into the bladder, it is filled with a weakly conductive solution (glucose 5%, turusol) - to provide the surgeon with a high-quality examination. Further, all manipulations are performed under video monitoring, which is provided by a camera built into the resectoscope with multiple magnification. The doctor carefully examines the walls of the bladder and determines further tactics. The

technique of transurethral bladder resection depends on the size, shape of the prostate adenoma, or the degree of prevalence of the neoplasm. With large sizes, it is necessary to carry out fractional removal. If it is not large, it is deleted as a single block. First, the tumor is excised, followed by the surrounding mucous membrane and muscle layers. This allows you to avoid relapse in the future.

Possible postoperative complications:

- bleeding
- infectious complications (cystitis)
- Tur-syndrome
- urethrorrhagia, perforation of the urethra
- retrograde ejaculation
- perforation of the bladder.

PERCUTANEOUS NEPHROLITHOTRIPSY

Percutaneous endoscopic operations in the treatment of urolithiasis began to be used due to the introduction of percutaneous puncture nephrostomy (PNS) in hydronephrosis in 1953. It was she who became the first stage in the development of percutaneous techniques for the treatment of nephrolithiasis. Since then, the procedure of puncture nephrostomy has changed significantly and enriched the possibilities of modern Urology in the treatment of kidney stones. At first, percutaneous access was used only to restore the outflow of urine from the blocked kidney, but over time, this method was used to prepare for more complex procedures (litoextraction, lithotripsy, antegrade endopyelotomy, resection of papillary cancer of the upper urinary tract). This was made possible by technological progress, the creation of X-ray and endoscopic equipment, contact and non-contact means of stone fragmentation. To understand and evaluate the current directions of development of the therapeutic strategy of sci, let's turn to history. The following historical events, discoveries and technical developments naturally served as the basis for improving percutaneous technology and expanding indications for its use:

3000 BC – percutaneous catheterization of the bladder (Ancient Egypt);

* 1865-simple percutaneous kidney puncture (T. Hillier);

* 1925-development of a method of trocar drainage of the kidney in hydronephrosis (J. Israel, W. I srael) ;

* 1941 - first extraction of a kidney stone through the formed nephrostomy tract (E. Rupel, R. Brown);

* 1951-antegrade percutaneous pyelography under X-ray control (N. Ainsworth, Vest);

* 1953-development of the method of percutaneous puncture of blood vessels (S. Seldinger);

* 1955-percutaneous puncture nephrostomy under X-ray control with the joint participation of radiologists (W. Goodwin);

* 1970-electrohydraulic disintegration of large stones of the urinary system (H. Sachse);

* 1974-puncture nephrostomy under ultrasound navigation (J. Pedersen);

* 1976-two-stage removal of a kidney stone using the dilation technique (I. Fernstrom, B. Johansson);

* 1977-application of an ultrasonic lithotripter to break down and extract stone through nephrostoma (K. Kurth, R. Hohenfellner, J. Altwein);

1980-1982-development of skin-renal access technologies (buzhi and dilators P. Alken, K. Amplatz);

* 1983-formation of the cutaneous-renal tract using a balloon dilator for angioplasty (K. Slayman);

1985-first publication on the experience of performing 1000 percutaneous nephrolitholapaxia procedures (W. Segura);

1989-a new era of treatment of urolithiasis by extracorporeal lithotripsy (introduction of the hm4 lithotriptor);

* 1990-development of percutaneous renal surgery in the supine position (JG. Valdivia);

* 2008 - use of multiport percutaneous treatment of coral nephrolithiasis (M. Desai);

* 2012-the PNL method is defined as the first line of therapy for coralloid and large kidney stones.

Percutaneous surgery was first called litoextraction nephroscopy, then nephrostomoscopy. Currently, the term "percutaneous nephrolithotripsy" is more common, and the term "nephrolitholapaxis"is used when performing lithotripsy and removing fragments.

INDICATIONS FOR PERCUTANEOUS NEPHROLITHOTRIPSY

Currently, indications for the use of percutaneous nephrolithotripsy may include:

- technical contraindications to RL;

- no effect from RL;

- stones of the lower Calyx - with the predicted ineffectiveness of stone discharge after RL;

- the need to eliminate obstructive complications of RL;

- "infected " and" pricked " stones of the kidney and upper third of the ureter (monotherapy);

- large, coralloid and multiple kidney stones (monotherapy);

- combined (in combination with RL) treatment for large, coral-like and multiple stones;

- combination of the stone with intracalcular obstruction of the urinary tract, which can be eliminated by percutaneous intervention (endoscopic infundibulotomy, endopielo (uretero) Tomia, dilation of upper urinary tract strictures);

- special clinical situations-the presence of a renal artery aneurysm, diseases of the blood coagulation system, in which RL is contraindicated.

- indications for percutaneous nephrolithotripsy in children are multiple, coralloid, recurrent and residual stones, stones in combination with HSS strictures, stones and kidney abnormalities, including in the absence of an effect from RL. Performing percutaneous nephrolithotripsy allows simultaneous correction of the PUS or calyx neck in children (bougie, balloon dilation or endotomy).

- performing percutaneous nephrolithotripsy with low-density (300-600hu) stones up to 2 cm in the lower calyces and a sharp Calyx-toe corner, when RL can lead to non-divergence of fragments.

The choice of percutaneous treatment before RL is determined by the following clinical situations::

- Bowl stones larger than 20-25 mm, coral-like stones of complex configuration(sandwich therapy in combination with RL), lower Cup Stones, Cup diverticula stones;

- anatomical features of PCS;

- high-density stones (more than 1000HU);

- predicted multi-stage RL;

- the presence of constrictions and strictures of the PCS and the upper third of the ureter, which occurred against the background of prolonged standing of the stone.

TECHNICAL FEATURES OF PERCUTANEOUS NEPHROLITHOTRIPSY

Percutaneous removal of concretions of the Calico-pelvic system is performed in an X-ray operating room equipped with an endoscopic stand and an X-ray navigation system. A necessary condition at the stage of PCS puncture is the presence of an ultrasound machine with a puncture nozzle.

Stage 1 (percutaneous access) - a) navigation, B) puncture, C) dilation; Stage 2 (destruction and extraction) - a) disintegration of concretions, B) removal of fragments with an assessment of the completeness of release (fig. 40, 41); stage 3 (drainage) - a) nephrostomy, B) methods of closing the cutaneous-renal canal and internal drainage.

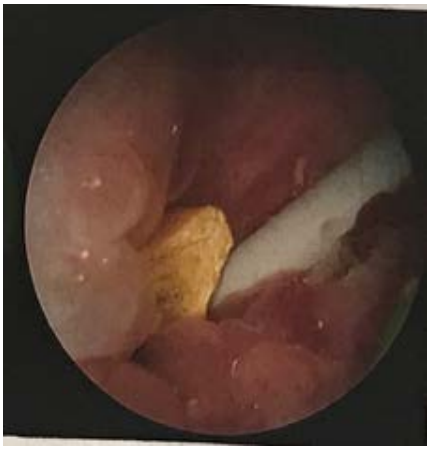


Fig. 40. Nephrolithotripsy.

https://www.urotoday.com/conference-highlights/wce-2018/107019-wce-2018-first-ultra-mini-percutaneous-nephrolithotripsy-with-the-new-thulium-superpulse-fiber-laser.html

Fig. 41. Removal of the pelvic stone obturating the pyeloureteral segment.

https://www.sciencedirect.com/topics/nursing-and-health-professions/ureter-stone

PERCUTANEOUS ERRORS AND COMPLICATIONS

NEPHROLITHOTRIPSY

There are the following errors and complications of PNL: - errors and complications when performing a renal pelvis puncture: through puncture or incorrect pelvis puncture;

- loss of the puncture passage during dilation of the nephrostomy canal;

- breakage of the flexible end of the metal conductor;

- unsuccessful attempt of litoextraction as a result of performing incorrect access to the kidney, migration of the stone to one of the calyces, migration of the stone to the ureter;

- bleeding: fornical, from the walls of the nephrostomy canal;

- incorrect installation of nephrostomic drainage;

- spontaneous prolapse of nephrostomy drainage;

- loss of the stone in paranephria during its extraction;

- pyelonephritis attack;

- ureteral stricture.

The most common postoperative complications of CNL include urine leakage through the fistula, problems caused by residual stones, fever, and bleeding.

Leakage of urine and completeness of removal of concretions are determined by endoscopy and X-ray at the end of the operation. If in doubt, a standard CHNL is performed with the installation of a nephrostoma. Fever in the postoperative period can occur even with sterile preoperative urine seeding and perioperative antibiotic prophylaxis, since the stones themselves are the source of infection. The pressure of the irrigation fluid during the operation is less than 30 mm Hg.St. and adequate postoperative urinary tract drainage are important factors in preventing postoperative sepsis. To prevent high intrinsic pressure of the irrigation fluid, an Amplatz nephrostomy casing specially designed for these operations is installed. Bleeding after PNL may be caused by intraparenchymal hemorrhage or acquired intraperitoneal aneurysm. In the case of intraparenchymal hemorrhage, the bleeding is stopped by briefly squeezing the nephrostomy tube. Stopping such bleeding requires superselective embolization of the artery.

INSTRUMENTAL METHODS IN UROLOGY.

Types of catheters.

Catheters can be flexible, elastic, or rigid (usually metal), with different angles of inclination of the beak. Elastic catheters are made of polymer materials (polyvinyl chloride, silicone, latex, Teflon). They are less traumatic than metal ones and are more easily tolerated by patients. The effect on the urinary tract mucosa also depends on the material from which the catheter is made. Catheters also differ in diameter, shape, number of channels and fixation mechanism, while balloon catheters also differ in the volume of the balloon. In urology, Nelaton, Foley, Timan, Pezzer, and Mercier catheters are most often used. The length of the catheters is from 24 to 36 cm, the size according to the Chariere – from 12 to 32. the diameter of catheters and most endoscopic instruments is traditionally measured on the Chariere scale (Fig. 42.)

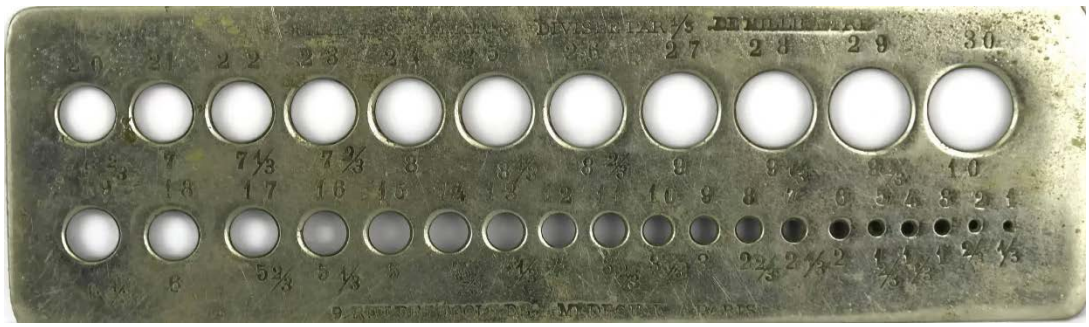


Fig. 42. Chariere Scale

https://www.lebonheurvintage.com/listing/576454664/charriere-scale-antique-french-catheter

The French catheter diameter scale (often abbreviated as Fr or F) is commonly used to measure the outer diameter of cylindrical medical instruments, including catheters. On the French scale, the diameter in millimeters of a catheter is determined by dividing it by 3 numbers. This can be represented using the following equation:

D (mm) = Fr / 3 F Fr = D (mm) x 3

Where, D is the diameter in MM; Fr is the chariot catheter number.

For example, if on the French scale the number of a catheter or bouget is 9 Fr, then the diameter is 3 mm.

The French scale was proposed in the XIX century by Joseph-Frédéric-Benoît Charrière, a Parisian manufacturer of medical instruments, who determined the ratio "diameter multiplied by 3". In some countries (especially French-speaking ones), this unit is designated as Charrier and denoted ch).

A catheter is a hollow tube with 1 or 2 holes in its beak, and the pavilion is slightly expanded. The beak can be straight or curved at an angle of 25-30°, its shape is cylindrical or conical. The catheters are designed for single use, but metal catheters can be used repeatedly. Depending on the tasks that need to be solved, a specific type of catheter is chosen in each case. The Nelaton catheter has a single stroke and is used for diagnostic or intermittent catheterization of the bladder. The Foley catheter is two-way, an additional stroke is necessary to supply fluid to the catheter balloon located in the bladder, the balloon allows the catheter not to migrate through the urea and, if necessary, can perform a hemostatic function in cases of bleeding from the bladder neck.

There are two-and three-way catheters. An additional course is used to create continuous irrigation of the bladder in patients with macrohematuria. It should be noted that in three-way catheters, the channels are narrower than in two-way catheters.

Types and design of urinary catheters.

Catheters can be latex, silicone, Teflon, and other soft modern materials (soft), elastic (semi-rigid), and metal (rigid).

Siliconized catheter made of thermoplastic polyvinyl chloride, has a soft, rounded end and two oval holes-eyes located in a ledge, which provides the best drainage

without the risk of catheter obturation. Catheters are used for short-term catheterization of the bladder and / or the release of urine.

Soft catheters for long - term operation in the bladder cavity have an inflatable canister with a capacity of 30 to 100 ml of liquid and a length of 40 cm. In men, urinary catheters can also be used, which are put on the penis like a condom (uropreservative).

All catheters end blindly, the vesicular end of the catheter is rounded,and there is a lateral oval opening at a distance of 1-1.5 cm from it. The male metal catheter is up to 25 cm long, while the female catheter has a slightly curved beak and a length of up to 15 cm.

The Nelaton Thymann-tipped catheter is a system for collecting urine from patients with obstructive urethral pathology for short-term catheterization. The end of the catheter has a special bend for more efficient drainage of urine. Nelaton catheter (fig. 43) - conical with one hole. It is used in cases where there is no need for a permanent catheter; the Timman or Mercier catheter (fig. 43), has a curved end up (beak), which facilitates its passage through the urethra;

Fig. 43. Nelaton, Timon and Mercier catheter

http://rep.bsmu.by/bitstream/handle/BSMU/3961/%D0%9D%D0%B0%D0%B1%D0%BB%D1%8E%D0%B4%D0%B5%D0%BD%D0%B8%D0%B5%20%D0%B8%20%D1%83%D1%85%D0%BE%D0%B4%20%D0%B7%D0%B0%20%D0%B1%D0%BE%D0%BB%D1%8C%D0%BD%D1%8B%D0%BC%D0%B8.pdf?sequence=1&isAllowed=y

Foley catheter (fig. 44) - designed for long-term catheterization (from 7 days) of the bladder and simultaneous medical manipulations. This is a soft catheter made of hypoallergenic rubber, at the end of which there is a special balloon. Its filling with sterile water, saline or air ensures reliable fixation of the catheter in the bladder cavity.

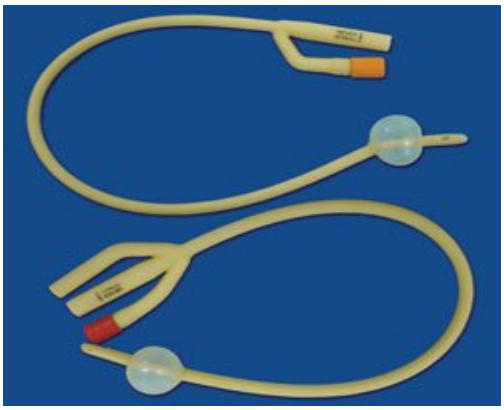


Fig. 44. Foley Catheter

http://rep.bsmu.by/bitstream/handle/BSMU/3961/%D0%9D%D0%B0%D0%B1%D0%BB%D1%8E%D0%B4%D0%B5%D0%BD%D0%B8%D0%B5%20%D0%B8%20%D1%83%D1%85%D0%BE%D0%B4%20%D0%B7%D0%B0%20%D0%B1%D0%BE%D0%BB%D1%8C%D0%BD%D1%8B%D0%BC%D0%B8.pdf?sequence=1&isAllowed=y

In urology, two-and three-way Foley catheters are used. The two – way one has two holes at the outlet end-one is designed to drain urine from the bladder, and through the second a catheter balloon is filled to fix it (the capacity of the balloon is from 30 to 100 ml). Foley's three-way catheter has a triple Lumen: in addition to the two aforementioned channels, there is a special channel for fluid irrigation. These catheters are widely used for postoperative drainage and irrigation of the bladder cavity with antiseptic solutions in patients who have undergone operations on the bladder and prostate gland.

The Pezzer Catheter (Fig. 45) - a system of drainage of the bladder through a cystostomy on the anterior abdominal wall. They are installed for a long time to

ensure the excretion of urine through the stoma, if it is not possible to remove urine through the natural urinary tract.

Fig.45. Pezzer Catheter

https://www.henryschein.com/us-en/medical/p/medical-surgical-supplies/urology-ostomy-supplies/pezzer-catheter-latex-amber/2604470

The Pezzer catheter is a self-locking catheter used for percutaneous suprapubic drainage of the bladder (epicystostomy). This catheter, instead of a beak, has an extended end in the form of a cap and is inserted into the bladder using a metal probe. The cap allows it to stay in the bladder. Currently, a large - diameter Foley balloon catheter (No. 24-28 Ch) is more often used for this purpose.

CATHETERIZATION OF THE BLADDER

Bladder catheterization in men is a medical intervention performed for therapeutic or diagnostic purposes.

Therapeutic indications for catheterization:

1.acute (sudden) and chronic (gradually developed and long-term) urinary retention.

2.helpless state, including comatose, in which, for hygienic or medical reasons, it is impossible to maintain independent urination.

3.the patient's State of shock for monitoring urination.

4. removal of blood clots.

5.postoperative restoration of the urethral Lumen (mild bougie).

6.performing transurethral interventions.

7.intravesical chemotherapy and administration of drugs into the urinary tract.

8.performing operations using epidural anesthesia or anesthesia.

9.performing tests using bladder urine.

10.x-ray examinations, when medications are administered orally.

11. Flushing.

12. if adequate care is not possible due to urinary incontinence and other methods of urinary drainage are not effective; after an injury, if other methods of urinary drainage are associated with increased pain.

Diagnostic indications for catheterization:

1.urine collection for laboratory tests.

2.check the integrity of the urinary tract in case of pelvic fractures and injuries.

3.contrast retrograde studies of the lower urinary tract, filling the bladder for ultrasound.

4. detection of urinary tract obstruction and localization of obstruction, etc.

5.urodynamic studies, determination of bladder capacity, residual urine volume, monitoring of urination.

6.determination of the volume of residual liquid.

Anesthesia

Preliminary anesthesia is not required, since one of the indicators of the correctness of manipulation is the absence of pronounced pain.

Contraindications:

Acute prostatitis, acute inflammation of the scrotum, acute urethritis, significant narrowing of the urethra, urethral rupture.

Complications

Damage to the urethra, prostate and sphincter of the bladder; infection, urethrorrhagia, hematomas.

Patient preparation

Informed voluntary consent of the patient. Styling: men-lying on their backs with their lower limbs straightened, women — on their backs with their lower limbs spread and bent at the knees.

Precautions: perform the manipulation carefully under pain control!

If you experience pain or blood, immediately stop inserting the bougie or catheter!

With severe spasms of the bladder sphincter in men, antispasmodic training is recommended, including relaxation with antispasmodics: no-shpa, baralgin, spasmalgon intramuscularly.

Methodology

Equipment. Sterile soft catheters of different diameters - 2 PCs.; cotton balls - 2 PCs.; gauze napkins - 2 PCs.; glycerin; Janet syringe; tray; diaper; sterile rubber gloves; urine container (if urine is taken for sterility testing, then the dishes must be sterile); tweezers, 700 - 1500 ml of sterile saline solution 0.9% of human body temperature, 0.05% aqueous solution of chlorhexidine; washing kit; container with dezrasvor (blanidas active 0.1%), marked with the inscription" for disinfection", for catheters waterproof bag for disposal .

1. wash your hands. They are treated with one of the antiseptic solutions (microsept).

2. put on a sterile tray two sterile catheters, the rounded ends of which are smeared with sterile glycerin, two sterile cotton balls moistened with chlorhexidine, two sterile wipes, tweezers, a Janet syringe with sterile saline solution heated to +37 +38 C.

3. wash the patient. A urine container is placed between his legs.

4. put on sterile gloves and stand to the right of the patient.

5. wrap the penis below the head with a sterile cloth.

6. take the penis between the III and IV fingers of the left hand (fig. 46), slightly squeeze the head of the penis, and I and II fingers slightly push the foreskin.

7. with the right hand, take a cotton ball moistened with furacilin and treat the head of the penis with movements from the opening of the urethra to the periphery.

8. one or two drops of sterile glycerin (Vaseline or categel) are poured into the external opening of the urethra.

9. take sterile tweezers in your right hand.

10. use sterile tweezers to take a catheter at a distance of 5 - 6 cm from the rounded end, and the free end is captured between the IV and V fingers.

11. insert the catheter with tweezers for 4 - 5 cm, holding it with the first and second fingers of the first hand, fixing the head of the penis.

12. intercept the catheter with tweezers and slowly insert it for another 5 cm. at the same time, the penis is pulled over the catheter with the left hand, which contributes to its better movement along the urethra.

13. as soon as the catheter reaches the bladder, urine appears, and the free end of the catheter should be lowered into the urine container.

14. after stopping the release of urine, the catheter is connected to a Janet syringe filled with sterile saline solution, and 100 - 150 ml of the solution is slowly injected

into the bladder, and then, by directing the catheter into the tray, the contents are removed.

15. washing is repeated until a clear liquid is released from the bladder.

16. after finishing washing, carefully remove the catheter from the urethra with rotational movements.

17. once again, treat the external opening of the urethra with a cotton ball moistened with chlorhexidine.

Fig.46. Catheterization of the bladder in men with a soft catheter.

https://assol.kiev.ua/?p=33680

Note. Before performing the intervention, it is necessary to establish a trusting relationship with the patient. It is necessary to maintain the sterility of the catheter at a distance of 20 cm from the rounded end. A nurse has the right to perform catheterization only with a soft catheter and only as prescribed by a doctor.

Catheterization in women.

Features of the anatomy of the female urethra (wide and short) greatly simplify this procedure compared to bladder catheterization in men. If there is no mechanical obstruction in the urethra, then bladder catheterization in women is not difficult.

Catheterization is the insertion of a catheter into the bladder. For it, you can use reusable catheters (made of rubber and metal) and single-use catheters (made of polymer materials) that have different Lumen diameters. Metal catheters are inserted only by a doctor.

Goal. Emptying the bladder; injecting medicinal compounds into the bladder.

Indications for bladder catheterization in women.

1-acute and chronic urinary retention;

2-obtaining urine for research on a special doctor's prescription;

3-Place treatment of bladder diseases.

Contraindications: acute inflammation of the bladder or urethra.

Equipment. Sterile soft catheter-2 PCs. different diameters, cotton balls - 2 PCs., gauze napkins-2 PCs., glycerin, Janet's syringe, tray, diaper; urine container (if urine is taken for sterility testing, then dishes for collection are obtained in a bacteriological laboratory (sterile)); sterile saline solution 700 - 1500 ml; 0.05% aqueous solution of chlorhexidine; rubber gloves (sterile); washing kit.

The patient's position is on his back with his legs bent at the hip and knee joints and his knees and legs spread apart (Valentine's position) or on a gynecological chair. After treatment with an antiseptic solution in the vestibule of the vagina, a catheter (elastic or metal) is smoothly passed through the urinary canal into the bladder.

Bladder catheterization in women, algorithm of execution.

1. treat your hands with a solution of antiseptics (microsept), prepare a sterile tray. Remove from the Bix and put on a tray, sterile catheters.

2. the rounded end of the catheter is treated with sterile glycerin. Two sterile cotton balls are moistened with a solution of chlorhexidine, placed on a tray. Also, two sterile wipes and tweezers are placed on the tray. 100 - 150 ml of sterile saline solution is collected in a Janet syringe and placed on a tray.

3. wash the patient, clean the ship.

4. a clean, dry vessel or other urine container is placed between the patient's legs spread apart and bent at the knees.

5. they put on gloves.

6. standing to the right of the patient, put an unfolded gauze cloth on her pubis. With the fingers of the left hand and a cotton ball, spread the labia (fig. 47), with tweezers taken with the right hand and a cotton ball moistened with chlorhexidine, treat the external opening of the urethra. Then, with tweezers, taking it as a writing pen, take the catheter at a distance of 4 - 5 cm from its blunt end, and the free end is supported between the IV and V fingers. The blunt end of the catheter is slowly inserted into the urethra by rotational movements to a depth of 4 - 5 cm, and the free end is lowered into a urine container. The discharge of urine indicates that the catheter is located in the bladder.

7. after stopping urinary excretion, the catheter is connected to a Janet syringe filled with sterile saline solution heated to body temperature.

8. slowly inject the solution into the bladder, and then, after directing the catheter into the vessel, remove it from the bladder.

9. repeat rinsing until the washing liquid is clean.

10. after finishing washing, carefully remove the catheter from the urethra with rotational movements.

11. once again treat the external opening of the urethra with a ball moistened with a solution of chlorhexidine, remove the remaining moisture from the perineum with a napkin.

12. the catheter is immediately packed in a waterproof bag for disposal.

Fig. 47. Catheterization of the bladder in women with a soft catheter.

https://oniko.kiev.ua/ru/products/simulators-and-trainers/sestrinska-sprava/kateterizatsiya/trenager-dlya-kateterizatsii-ginka.html

Note. A nurse has the right to perform catheterization only with a soft catheter and only as prescribed by a doctor. When performing bladder catheterization, complications may occur:

- infection of the bladder,

- damage to the mucous membrane of the urethra and bladder,

- urethral fever.

Metal catheter catheterization of the bladder in men

Catheterization of the bladder with a metal catheter in men with acute urinary retention due to benign prostatic hyperplasia or reflex urinary retention requires certain techniques. This procedure should only be performed by a urologist or surgeon who knows the technique of catheterizing the bladder in men with a metal catheter. This rule is confirmed by a number of serious complications that can develop during catheterization of the bladder with a metal catheter in men, as will be discussed below.

The patient's position is on his back with his hips spread apart. The doctor, standing to the right or left of the patient, holds the exposed head of the penis tightly with two fingers of the left hand and, after treating the external opening of the urethra with a gauze ball moistened with an antiseptic solution, inserts a catheter smeared with glycerin into the urethra. This is the traditional method of performing this stage of catheterization. A slightly modified technique of this stage can be used: a cannula of a disposable syringe and 4-5 ml of sterile glycerin are inserted into the urethra. After removing the syringe, the urethra is squeezed with your fingers in the area of the coronary sulcus, which prevents the flow of glycerol in the urethra.

The catheter is taken with the right hand so that its pavilion lies on the palmar surface of the first two phalanges of the index and middle fingers and is held by the thumb lying on top. Since the male urethra in the horizontal position of the patient has an S–shape, holding a metal catheter requires absolutely certain directions of movement at different stages of catheterization.

The first stage.

The end of the catheter's beak is inserted into the external opening of the urethra. The penis is held with the left hand parallel to the pupart ligament and the penis is pushed over the instrument, while the catheter is pushed through the urethra with the right hand without violence until its beak penetrates the bulbous part of the urethra, where an obstacle is felt (fig. 48 a, b, c, d).

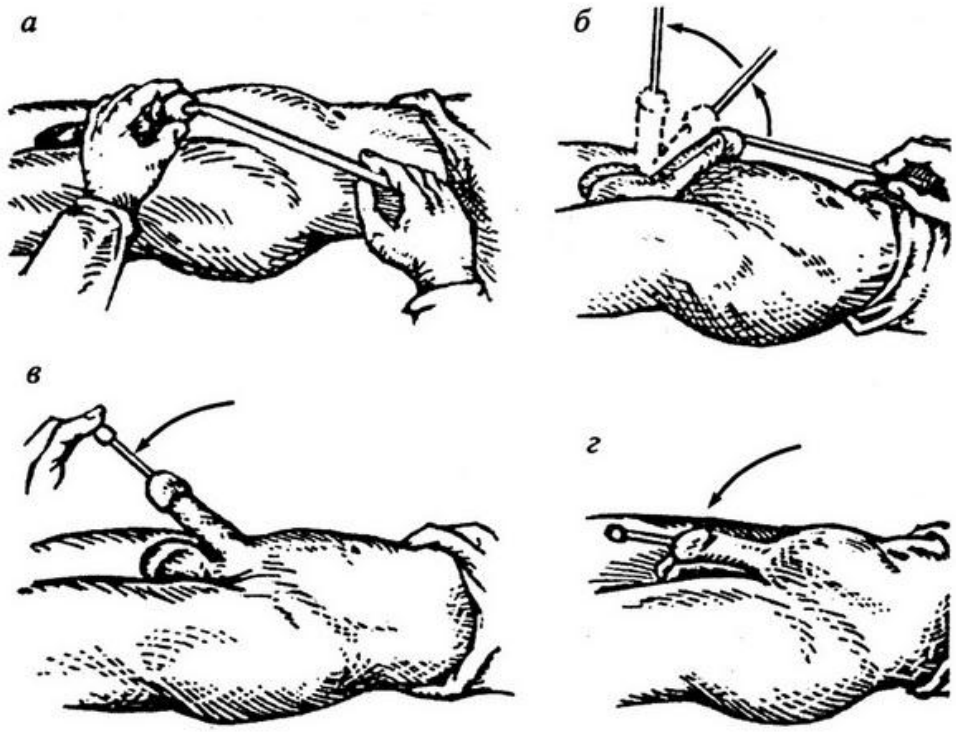


Fig. 48 a, b, c, d. Catheterization of the bladder with a metal catheter.

https://7tg.com.ua/masazh-prostati-yak-robitsya-texnika-provedennya-masazh-prostati-palcem/

The second stage.

The penis with a catheter inserted into the urethra is moved to the midline of the abdomen so that the head of the penis and the catheter Pavilion "look" at the navel. Then they begin to remove the catheter from the abdominal wall in the direction of the scrotum. In this case, an obtuse angle is formed first between the catheter and the abdominal wall. At this point, the catheter's beak passes through the bulbous part of the urethra (see fig. 48, B).

The third stage.

The catheter pavilion is lowered downwards (see fig. 48, C, D) holding the penis in a light tension. At this point, the beak of the catheter slips through the membranous part of the urethra and, when the pavilion is further lowered down,

enters the bladder. In Benign Prostatic Hyperplasia, when the prostatic part of the urethra is elongated, the catheter beak is inserted carefully and shallowly into the bladder cavity. After the catheter's beak enters the bladder, urine begins to be released from it, and the pavilion easily rotates to the right and left along the longitudinal axis of the catheter.

The basic rule of catheterization of the bladder with a metal catheter in men is to carefully, without any violence, conduct the instrument along the urethra. Urethral deviations and the presence of benign prostatic hyperplasia create conditions for the development of severe complications during bladder catheterization. Therefore, if attempts to perform bladder catheterization with a metal catheter are unsuccessful, the doctor should stop further attempts and perform a bladder puncture or apply an epicystostomy.

Difficulties in catheterization of the bladder in patients with prostate adenoma are caused by the fact that in this disease, in addition to lengthening, deforming and narrowing of the prostatic urethra, the neck of the bladder rises, the configuration and condition of the internal opening of the urethra change. This leads to the fact that the beak of the metal catheter either does not reach the proximal part of the prostatic urethra, or is located eccentrically in relation to the internal opening of the urethra. In this situation, damage occurs to the prostatic urethra and hyperplastic prostate tissue.

You should use a catheter of the maximum diameter that can pass through the external opening of the urethra, because in this case the probability of lateral excursions of the instrument decreases, which makes catheterization safer.

Contraindications for catheterization of the bladder with a broom catheter are ruptures, strictures, urethral tumors, inflammatory diseases of the scrotum organs. In these cases, epicystostomy is indicated for acute urinary retention.

Prevention of complications when installing a permanent catheter.

If bladder catheterization is necessary, the duration of catheter use should be minimal. The best way to prevent non-specific infection of the genitourinary organs is to limit the use of permanent urinary catheters if possible.

A permanently closed (sealed) drainage system is the best guarantee for the Prevention of infectious complications when installing a permanent catheter. In the presence of an open drainage system, a urinary tract infection develops after 3-4 days. Errors in the care of a sterile closed drainage system are predisposed to the development of a urinary tract infection. When using closed drainage systems, proper placement of the catheter and reducing the number of unjustified manipulations with it after its installation and prescribing uroantiseptics in therapeutic doses can reduce the risk of infection.

The following are measures to avoid the use of permanent catheters in different categories of patients.

Operated patients.

1. avoid hyperhydration.

2. do not prescribe anticholinergic drugs.

3. install bedside urinal receiver.

4. provide a free mode of urination.

5. provide heat to the suprapubic area.

6. prescribe medications that stimulate the contraction of the bladder and relax its external sphincter.

7. perform a single catheterization in the absence of urination for 4-6 hours.

Patients of intensive care units.

1. remove the permanent catheter as the patient's condition stabilizes.

2. perform periodic catheterization if necessary.

3. in men, use condom-type catheters.

Patients with oliguria.

1. Do not use urinary catheters; consider performing ultrasound to determine the causes of oliguria.

Elderly patients suffering from urinary incontinence.

1. forced urination mode.

2. use absorbent pads.

3. if necessary, use condom-type catheters in patients with a penile prosthesis.

Patients with neurogenic bladder.

1. perform periodic catheterization.

2. perform suprapubic catheterization of the bladder to prevent the development of epididymitis.

Measures with a permanent catheter installed to reduce the frequency of infectious complications are as follows::

1. the urinal should not be raised above the level of the bladder (otherwise vesicular reflux is possible). Sometimes a disinfectant is added to the urinal.

2. washing the bladder is carried out 3-4 times a day; the volume of liquid for washing is equal to the functional capacity of the bladder. You can use any sterile solution that does not irritate the bubble walls.

3. catheter size. It is advisable to use a catheter of up to 16 F caliber. Large-diameter catheters cause urethral abscesses in men and dilation in women. When using a Foley

catheter, it is enough to inject 5 ml of liquid into the balloon. In men, the catheter is attached to the abdomen, as otherwise it can bend the level of the penis and scrotum and cause pressure sores.

4. conventional rubber catheters without signs of urinary tract infection are changed every 3 days. Less salt settles on Teflon catheters, so they can be changed less often.

5. the Foley catheter with a balloon is less suitable for permanent use, as the balloon irritates and squeezes the bladder wall. However, it has to be used in women, as it is difficult for them to fix a regular catheter. In men with a catheter well attached to the penis and abdomen, it is not necessary to inflate the balloon.

6. the risk of infection with a permanent urinary catheter increases by 5% every day.

7. according to the results of a randomized prospective study, removal of the urinary catheter at midnight (instead of 6 am in accordance with generally accepted practice) provides accelerated recovery of independent urination and significantly reduces the time of hospitalization of patients.

Care for a permanent bladder catheter.

The presence of a permanent catheter in the patient to remove urine from the bladder implies careful hygienic care and compliance with the optimal drinking regime for the patient. The patient needs to consume fluids more often, reducing the concentration of urine and thus reducing the likelihood of developing a urinary tract infection. Hygiene measures should include perineal and catheter care. At the same time, precautions should be taken:

1. wash your crotch from front to back.

2. make sure that the extension tube is securely attached to the inner thigh with a patch.

3. attach the drainage bag to the bed below the patient's bladder, but so that it does not touch the floor.

4. make sure that the catheter tube does not twist or form a loop.

To care for the perineum, you need to prepare:

1. rubber glove.

2. oilcloth.

3. napkins or paper towel.

4. garbage bag.

5. dirty laundry bag.

6. gauze swabs.

7. clamp.

8. a jug or basin for washing.

9. soap.

To perform the procedure.

1. lower the headboard of the bed so that the patient lies on his back horizontally.

2. cover the patient with a blanket, leaving the pelvis and legs open.

3. put oilcloth under the patient's buttocks and place the vessel on it. Ask the patient to bend his knees and lift his buttocks. If he is unable to do so, turn him over on his side and lay down the glue, then turn him over again on his back.

4. pour warm water into a jug.

5. wear gloves.

6. stand to the right of the patient, take a clip with a gauze swab in your right hand, and a jug of warm water in your left hand. Start treating the skin from top to bottom: from the genitals to the anal opening (cotton swabs need to be changed after each movement from top to bottom).

7. use a dry cloth to wipe the skin of the perineum in the same direction.

8. using cotton swabs, wash and dry 10 centimeters of the catheter, starting from where it comes out of the urethra. Examine the area around the catheter to see if urine is leaking.

9. attach the catheter tube with a patch to the patient's inner thigh. To prevent the catheter from being pulled out of the entrance to the urethra, loosen the tube tension and make sure that the drainage bag is attached to the bed.

10. remove the vessel, oilcloth, and gloves.

11. put the patient comfortably and cover him with a blanket.

12. ask how the patient feels after the procedure.

For emptying the urinary drainage sac.

1. wear gloves.

2. place the measuring container for collecting and measuring urine under the outlet tube of the drainage bag.

3. release the drain tube from the holder located on the side of the drain bag and open the Tube clip. Drain the urine into a measuring container.

4. close the clip, wipe the end of the discharge tube with a cloth soaked in alcohol, and secure the discharge tube in the holder.

5. remove your gloves and wash your hands after the procedure.

Complications.

1. suspected urethral perforation-stop further attempts at catheterization and consult a urologist.

2. arterial hypotension. Early hypotension is usually the result of a vaso-Vasal reflex to the rapid collapse of a stretched bladder. Late hypotension may develop due to excessive post-obstructive diuresis.

3. hematuria. It occurs when a catheter is inserted traumatic or the mucous membrane is slightly damaged due to the rapid collapse of the stretched bladder.

4. paraphimosis is a condition in which the foreskin, once displaced proximal to the glans penis, cannot be returned to its normal position.

5. catheter-associated urinary tract infections. Up to 80% of all nosocomial urinary tract infections are catheter-associated infections. The most common pathogens are Escherichia coli, Enterococci, Pseudomonas, Enterobacter, Staphylococcus aureus or Epidermidis, Klebsiella and Serratia. During prolonged catheterization, the following pathogens are more often isolated: Escherichia coli, Pseudomonas aeruginosa and Proteus mirabilis. During prolonged catheterization, bacterial films - "biofilms" - can form on the surface of the catheter. Measures to prevent catheter-associated urinary tract infections include the use of closed drainage systems, the use of catheters with an antibacterial (silver) coating, maintaining adequate drainage function, and strict compliance with indications for catheterization. In most cases, in asymptomatic patients, bacteriuria disappears on its own after removal of the catheter.

6. catheter obstruction. Catheter obstruction can be caused by "bio-films", cell clots, bends, bladder stones, or salt encrusting of the catheter. Catheter obstruction occurs in 40-50% of patients with prolonged catheterization. Leakage of urine past the catheter may indicate its obstruction. Preventive measures include the use of silicone catheters, as well as catheters with a large Lumen. To prevent encrustation of the catheter with salts, it is recommended to use lemon juice or citrate mixtures.

7. bladder spasm often develops against the background of prolonged catheterization and, as a rule, successfully responds to therapy with anticholinergic drugs. If cholinolytics are ineffective, botulinum toxin Type A is indicated. bladder spasm may also occur during catheterization in patients suffering from chronic constipation. In this case, it is necessary to adjust the diet and maintain an adequate amount of fluid consumed.

8. pain in the bladder area. In patients suffering from chronic constipation, pain occurs more often. It is successfully purchased by prescribing anticholinergic drugs.

9. extravasation of urine as a result of traumatic catheterization. With minor damage to the bladder, adequate drainage provides a good therapeutic effect. If the bladder is seriously damaged, surgery may be required. Currently, the market of medical products offers a fairly large selection of urethral catheters of both domestic and foreign production. Various versions allow you to equip any department of urology. Among the variety of catheters, I would like to highlight medical Urological Catheters manufactured by Covey-Dien LLS, USA, Urological Catheters manufactured by Teleflex medical Jurop Limited, Ireland and urological catheters manufactured by Apexmed International B. V., The Netherlands. The experience of using these products shows that they meet all modern requirements for urethral catheters described in this article.

TO CARRY OUT BOUGIE

Bougie (from the French bougie—candle) - tools designed for the expansion and study, as well as treatment of organs of the tubular shape of the human body. The use of bujas has been known since ancient times; the treatment of narrowing of the urethra is also found in wild peoples who use thin smooth twigs of plants as bujas. During the excavations of Pompeii, metal (bronze) buges for the urethra were found, which are very similar to modern ones. Wax candles of various calibers were used in the old days as Bujas. Currently, Bougie is made of steel and has a variety of shapes and sizes.

Bougie is divided into elastic and metal. Elastic bougie (fig. 49) straight, their end has a cylindrical, olive-shaped, button-shaped, filamentous or pointed shape.

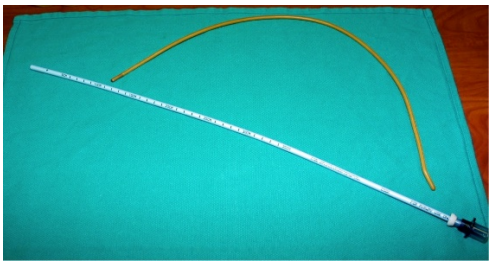


Fig. 49. Elastic head bougie.

https://www.medika.kiev.ua/%D0%B1%D0%B3-bougie-urethral

Straight metal bougie (fig. 50) are used for bouging the anterior part of the urethra, and curved (fig. 51) - to conduct them along the male urethra to the bladder.

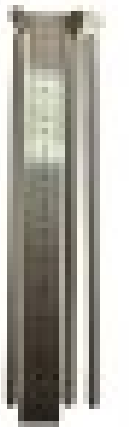


Fig. 50. Metal bougie: - straight.

https://www.medika.kiev.ua/%D0%B1%D0%B3-bougie-urethral-metal-lines-set

Fig. 51. Metal bougie: - curved.

https://mdth-ua.com/ru/medicinskiy-instrument/urologicheskie-instrumenty/buzhi-uretralnye

According to The Shape of the curvature, they are distinguished (fig. 52.): Buji Guyon-Sinitsyn with a beak curvature of 1/2 circle, Buji Dittel with a very moderate curvature and a conical beak, Buji Beneke with a double beak curvature, Buji Roser with a thickening Olive at the end of the beak.

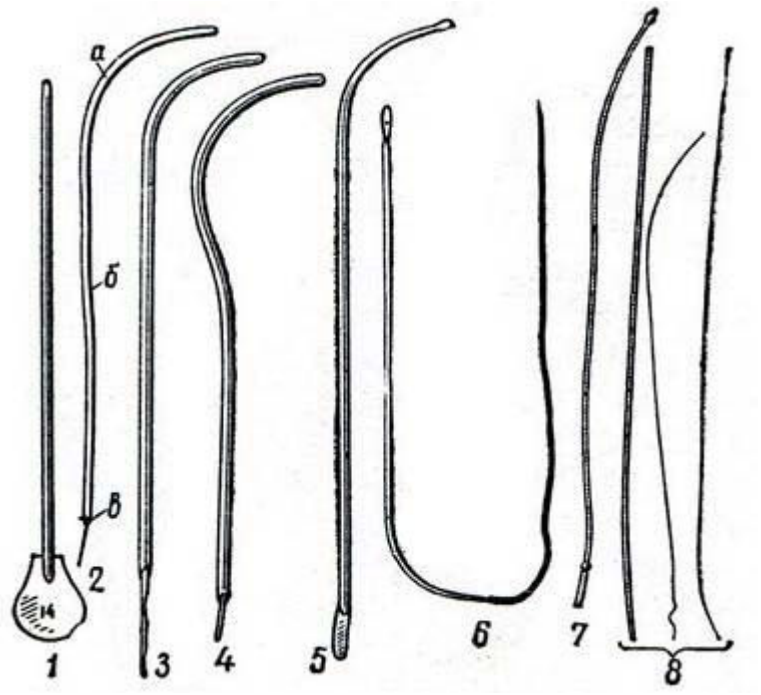


Fig. 52. Urethral bougie

1) — metal straight line; 2) - Guyon-Sinitsyn (a) - beak, B) - Body, C) - Pavilion); C) — Dittel; 4) - Benecke; 5) - Roser; 6) - Lefora with elastic conductor; 7) - elastic head buge-instillator; 8) - elastic bougie.

https://diagnoza.net.ua/diagnostika/buzhuvannya-uretri-u-cholovikiv-i-zhinok-pokazannya-pidgotovka-vikonannya-proceduri-vidguki.html

In bougie, there is a distinction between the beak, body, and pavilion, or handle. Metal urethral bougies can be straight or curved. Straight lines are used for bulging of the urethra urethra in women and the anterior part of the urethra in men; curved (with different curvature, respectively, of the posterior curvature of the male urethra) — for bulging of the urethra in men.

Bougie is made in different diameters: from 1 mm (so-called filamentous) to 10 and is distinguished by numbers (on the Chariere scale), each number of which differs from the next one by 1/3 mm. For example, bougie No. 30 on the Chariere scale has a diameter of 10 mm,No. 10-3. 3 mm, etc. it is usually indicated on the bougie Pavilion. Bougie is available in sets: elastic from No. 3 to No. 30, metal from No. 12 to No. 30.

The use of thin metal bougie is dangerous due to the possibility of damage to the wall of the urethra. Therefore, they are used with an elastic conductor that is screwed to the beak of the bougie Lefor. Of the metal bougie, Roser's bougie with a smooth oil at the end in the form of a button, which prevents perforation of the urethra wall, is somewhat less dangerous. To study the urethra and inject drugs into its posterior part, flexible head bougies with an internal Lumen are used, through which drugs can be injected with a syringe. The industry produces the following types of bougie:

- elastic conical ones are used to determine the presence and location of strictures (narrowing of the urethra) and the diameter of the narrowing; they are especially convenient for narrow strictures. They are made of plastic and can withstand up to 20 disinfection cycles by boiling in water.

- the buj probe is used for studies of the anterior urethra. Boujis a rod with a curved end with a length of 200 mm and a diameter of 3 mm, it is made of brass with a nickel coating.

- metal bougies are used for mechanical expansion of urethral strictures by sequentially introducing larger-caliber bougies into it. They are an all-metal rod of cylindrical shape with a rounded working end, the other end has a plate that replaces the handle, on which the tool number is indicated, it is made of brass, after which they are nickel-plated and glossy, the surface is smooth, without waves. They are produced in four types in a complete set or in sets of the same type.

- curved bougies are designed for bougie of the anterior and posterior parts of the urethra, so they are most often used in medical institutions. Unlike the previous bougies, curved bougies are longer and have a characteristic bend; they are produced in sets No. 16 to 27.

- with a button, they are the safest, since they are easier to hold and less injure the urethra; they are produced in a set of eight pieces from No. 5/7 to 16/18 (the number in the numerator corresponds to the diameter of the button, in the denominator – the diameter of the bougie Rod). Its length is 276 mm.

- for tunneling the urethra with short constrictions. Similar to bujams with a button; but slightly longer (300 mm) and have a side hole on the button (olive). They are made with numbers # 12 and 20.

- Buji with an elastic conductor is used in case of significant narrowing of the urethra. An elastic conductor made of nylon, screwed onto a curved Bougie, is inserted into the urethra, and its expansion is achieved by systematic bougie, increasing the caliber of the bougie. They are issued in a set of three numbers: No. 12, 14, 16.

The tow truck is designed in combination with an aspirator for washing out stones crushed with a cystolithotriptor from the bladder. They are catheters made of brass with a four-sided handle ending in a cone-shaped cannula, to which an aspirator tube is attached. The tow truck is equipped with a mandrel with a powerful HEX handle. With the help of a mandrel, additional grinding of stones can be carried out – turning them into sand. Tow trucks are produced in four types: numbers 22 and 24 with small and large curvature.

Indications for bougie

Bougie is used to diagnose and treat urethral constrictions. During the diagnosis, the doctor, promoting bougie, reaches the point of maximum narrowing. A stone in the urethra can also interfere with progress. Thus, the exact location of the narrowing and the stone is established. The treatment procedure begins

immediately after diagnosis, it goes the same way, but lasts longer. The only indication for such manipulations is narrowing of the urethra in adults and children.

Urethral strictures occur for many reasons:

- congenital anomalies,
- after infections and inflammations, sexually transmitted diseases,
- due to mechanical injuries of the pelvis, perineum,
- after rough medical procedures with penetration into the urethra,
- scarring of the tissue after surgery.

Contraindications for bougie

- cystitis,
- suspicion and presence of tumors,
- pyelonephritis,
- blood clotting disorders,
- chronic and acute renal failure,
- urethral injury,
- urethritis,
- phimosis and paraphimosis,
- inflammation of the testicle and glans penis.

In addition, the patient himself may refuse treatment in favor of other methods. For various reasons, an obstetrician-gynecologist may prohibit women from performing such manipulations. To accurately determine whether the patient needs such a procedure and exclude the presence of contraindications, first conduct a series of examinations. Careful preparation of the patient reduces the likelihood of complications.

Bulging of the urethra

Urethral bougie begins with the use of bougie No. 16-18 on the Chariere scale. To improve the sliding of bougies and reduce pain in men, a special gel with an anesthetic is injected into the urethra. Normally, such a bougie passes through the urethra freely, meeting slight resistance in the membranous part. If the buge meets an insurmountable obstacle, then note how far it is located, and proceed to use smaller buges in diameter, until the buge passes through the stricture, the size of which will determine the degree of narrowing.

Straight bougie is used when the stricture is located in the anterior urethra, their introduction is usually not difficult. If strictures are localized in the posterior part, then curved metal bougies are used. A curved metal bougie is inserted in the same way as a metal catheter into the bladder.

If it is impossible to conduct a metal bougie through a significantly narrowed area of the urethra, filamentous elastic bougie is used, which overcomes the stricture. Then, as a conductor, large metal bougie are carried out along them. To expand (bougie) the urethral strictures, three to four bougies of increasing size are performed, and the last Bougie is left in the urinary canal for several minutes. Bougie of urethral strictures is a palliative rather than radical method of treatment, and it should be repeated on average once a month.

Methods of conducting diagnostic research methods.

Examination of the urethral wall on a straight bougie.

It is used in the diagnosis and treatment of chronic urethritis in men, less often in women. For this purpose, bougies of different diameters (from No. 19 to No. 30) are used, depending on the width of the external response of the urethra. Apply bougie: straight, curved, semi-rigid, elastic, filamentous, glabrous.

The patient is placed in a urological chair, bougie is lubricated with sterile glycerin or vegetable oil and injected into the anterior urethra. In the bulb, the probe

detects an obstacle that is easily overcome when the penis is straightened. Palpation of the urethra is performed on the bug. At the same time, pay attention to possible infiltrates, granularity. In the presence of a seal, its nature and localization are determined: anterior, middle, posterior part of the anterior urethra. If necessary, do a light massage. As a bougie when conducting a study for diagnostic purposes, it is better to use a tube with an obturator of the Valentine urethroscope, which makes it possible to immediately perform a urethroscopy if infiltrate, granularity, or atrophy is suspected. The greatest value is bougie with a head bougie when the urethra is narrowed, when it is necessary to determine the place of stricture, and sometimes its length.

Introduction of bougie and massage of the urethra on a straight bougie.

Bulging of the urethra

Usually, metal bougies are used: straight when the hanging part of the urethra is affected and curved (with huyon curvature) when the bulbous part of the anterior urethra and posterior urethra are affected. Treatment begins with the use of bougie No. 18-20 on the Chariere scale, and in conclusion, the bougie of the largest diameter is used, which can be freely passed through the external opening of the urethra.

Lying on a couch or urological chair, the patient is disinfected with the glans penis and foreskin with an antiseptic solution. Bougie is lubricated with sterile Vaseline oil or glycerin. After that, a categel is inserted into the urethra, and then a buj is carried out into it. In the urethra, the bougie is left for 5-7 minutes. With each subsequent injection, especially in the presence of solid infiltrates and scar constrictions, start with a bougie of the size that was already applied during the previous session and only then try to conduct a bougie of a larger diameter. Bougie is performed at intervals of 1-2 days, depending on the patient's reaction.

If it is necessary to perform a massage on the bougie (infiltrates of the urethral wall, folliculitis, periurethritis), pre-wash the anterior urethra and fill the bladder with a disinfectant solution. Light stroking movements towards the head of the penis

massage the affected area for 2-3 minutes, gently pressing the soft tissues to the bougie. After the massage, the bougie is removed and the patient performs the act of urination, while the urethra is released from pathological products released from the lacunae and glands during the massage.

Instillation of medicinal substances into the urethra.

Instillation method

For instillations, solutions of miramistin, chlorhexides-on bigluconate 0.05%, octenisept, 0.25-0.5% silver nitrate solution and 2% protargol solution are used, which have bactericidal properties, cause irritation and hyperemia of the mucous membrane with subsequent regeneration of the epithelium, promote resorption of surface infiltrates.

Before instillation, the patient should refrain from taking fluids for 2-3 hours. To inject the drug solution into the anterior urethra, a special instillation syringe with a rubber or plastic olive-shaped tip (urethral syringe) is used or on a syringe for injection, instead of a needle, a rubber tip or catheter is put on. After urination, the patient is wiped with the head of the penis and foreskin with a cotton swab moistened with a disinfectant solution, and tightly pressing the tip of the syringe to the external opening of the urethra, 6-8 ml of the drug solution is slowly injected into it. In order to keep the solution in the anterior part of the urethra, the patient is offered to hold the head of the penis with his fingers or a special terminal is applied to it. In the anterior urethra, the drug solution is kept for 1-10 minutes, depending on its composition. After instillation, do not urinate for 1-2 hours.

For instillation of medicinal substances, a disposable Nelaton catheter moistened with sterile glycerin is inserted into the prostatic part of the urethra. After attaching the end of the catheter to the syringe, 3-4 ml of the solution is inserted into the posterior urethra and the catheter is slowly removed. The solution, inserted into the posterior urethra behind the external sphincter, is held there until urination. After

this procedure, the patient should not urinate for about an hour. Usually 5-7 instillations are prescribed, which are carried out in 1-2 days.

Washing the urethra according to Jean.

During washing, exudate is removed from the urethra, microorganisms are mechanically eliminated, active hyperemia and serous edema of the mucous membrane are created, and a beneficial effect on superficial infiltrative changes is observed. Washing is contraindicated in acute periurethritis (cavernitis), periurethral abscess, acute inflammation of the testicles and additional sex glands.

Method of large washing according to Jean: there is a distinction between anterior (anterior urethra) and total (deep) washing. For this purpose, a device consisting of an esmarch glass mug with a rubber hose equipped with a special clip and a glass tip is used. When washing the anterior urethra, a small pressure of fluid is required so that it does not accidentally pass into the posterior urethra through the external sphincter. In this regard, the mug is suspended at a height of no more than 0.5 m above the patient. With total washing, the mug is raised to a height of 1-1.5 m.

The tip during anterior washing is not pressed tightly, but only placed against the external opening of the urethra, so that the disinfectant solution, irrigating the walls of the anterior urethra and reaching the external sphincter, can then flow freely out. To wash the anterior urethra, you need about 0.5 liters of disinfectant solution heated to a temperature of 38-40°C.

Deep (total) washing is performed only after preliminary washing of the anterior urethra. The tip is inserted into the external opening of the urethra so that the walls of the urethra tightly cover it, preventing the solution from flowing out. The patient should stand during washing, as the external sphincter relaxes more easily in this position. The introduction of fluid into the bladder is facilitated if the patient relaxes the external sphincter during washing, simulating urination. Wash the

urethra daily for 2-4 weeks, alternating medicinal solutions, until the discharge stops and the pathological inclusions in the urine disappear.

Therapeutic tamponade according to Vashkevich.

Vashkevich tamponade technique: a urethro-furnace tube is inserted into the urethra, the obturator is removed and fixing the tube in the desired position, a loose cotton swab or thin gauze strips moistened with a medicinal solution are inserted into it with a urethral probe or tweezers with thin branches. Holding the tampon with a probe, the urethroscope tube is removed. The tampon is removed after 2-3 hours during urination. Glycerin solutions of protargol (2%), collargol (1 %), ichthyol (2%), as well as kalanchoe juice, corticosteroid ointments, etc.are used to wet tampons. Tamponade is done 2 times a week, but not more often than after 2 days

Bulging of the urethra

After treating the glans penis with a solution of chlorhexidine or 0.5% chloramine, bougie No. 16 is injected into the urethra according to Chariere without any violence. At the same time, it should pass freely or meet only a slight resistance at the stricture level. Bougie remains in the urethra for 2-3 minutes.

After extraction of bougie, the urethra is installed with an antiseptic solution (antibiotic solution, anti-inflammatory mixture). If during the following hours the patient does not respond to bougie with fever, chills, urethrorrhagia, then bougie can be repeated the next day, introducing the same bougie No. 16 again into the urethra, and so on daily until it passes through the urethra completely freely, without encountering the slightest resistance. Sometimes this can take several days or even weeks. Only when there is absolutely free patency of bougie No. 16, you can increase the diameter of the bougie, and only by one size, that is, the same manipulations are performed with bougie No. 17, then No. 18, and so on, until the diameter of the urethra reaches free patency for bougie No. 20-21.

The next task facing the doctor is to maintain the achieved diameter of the urethra for at least six months, that is, for the period of full maturation of connective tissue. Only in this case, you can expect that the scar will no longer narrow and will not cause a relapse of urethral stricture. Therefore, the doctor is obliged to maintain the achieved diameter of the urethra by constant bougie, while simultaneously carrying out anti-inflammatory measures.

Continuing to bulging of the urethra bougie No. 20, they begin to increase the inter-shaft between bulging of the urethra, first in a day, then in two days, three days, and so on. If, for example, the interval between bougie reached 8 days, and on the nine-day interval the doctor again noted the resistance to conducting bougie, then it is necessary to return to the eight-day interval and perform bougie according to this scheme until the next expansion of the interval causes the return of narrowing.

As can be seen from the above, conservative treatment of bulging of the urethra requires very much perseverance from the doctor and a lot of patience from the patient, since the slightest deviation from the specified scheme, interruption of bulging of the urethra or acceleration due to an increase in the diameter of the bulging of the urethra inevitably leads to a relapse of narrowing and requires repetition of everything from the very beginning.

The appearance of modern cystourethroscopes facilitated the doctor's work, since it became possible to assess the localization and extent of stricture Under Eye Control, to see the nature of tissue changes in the stricture area, and to purposefully inject hydrocortisone, lidase, and other medications into the scars. However, bougie continues to be the leading method of conservative treatment of urethral strictures with appropriate indications for it, and only methodically correct bougie ensures the success of treatment.

TEST TASKS

1. The patient has urate stone in the pelvis of the right kidney, oxalate stone in the left, both measuring 20x25 mm. What can I recommend to the patient?

a) dissolution of the urate stone on the right, the second stage is shock-wave lithotripsy or pyelolithotomy on the left
b) simultaneous pyelolithotomy on both sides
c) sequential pyelolithotomy with an interval of 2-3 months
d) puncture nephrolitholapoxia on the left and litholysis on the right
e) remote shock wave lithotripsy.

2. What should be done before transurethral ureteropyeloscopy?

a) study the medical history;
b) conduct a medical examination, as anatomical and congenital pathologies can complicate or exclude retrograde manipulations;
c) perform visualizing survey methods;
d) prescribe a short preventive course of antibiotics (<24 hours).
e) all of the above.

3. What does not interfere with transurethral ureteroscopy?

a) slit-like eye of the ureter
b) ureteral stricture
c) large prostate hyperplasia
d) narrowness of the intramural ureter.

4. What should I do if a large calculus is detected in the ureter?

a) strengthen distal traction by grabbing the stone with forceps
b) fragment the stone, remove small fragments
c) switch to an open operation
d) remove the nephrostoma.

5. The most serious intraoperative complication of Urs?

a) damage to the ureteral mucosa
b) ureter separation
c) bleeding of the ureteral mucosa
d) migration of the stone to the pelvis of the kidney.

6. To detect the presence of residual urine, it is necessary to:

a) Perform an ultrasound of the bladder
b) Ask the patient to urinate and determine the amount of urine
c) Inject a radioisotope substance intravenously and perform radioisotope renography
d) Ask the patient to urinate and then determine the amount of urine in the bladder by catheterizing it
e) Insert a contrast agent into the bladder and perform an X-ray.

7. Cystoscopic picture of chronic delay in sevopipuskaniya:

a) Ureterocele
b) Bladder polyp
c) Bladder stone
d) Trabecular bladder
e) The presence of prostate hyperplasia.

8. Contraindications to bladder catheterization for the purpose of urine evacuation

a) Hematuria
b) Injury to the urethra
c) Chronic cystitis
d) Prostatic hyperplasia.

9. The most common complication of bladder catheterization:

a) Hematuria
b) False passage of the urethra

c) Urethrorrhagia
d) Urinary tract ejection.

10. Leading method for diagnosing chronic cytitis:

a) Cystoscopy.
b) Urine microscopy.
c) General urinalysis.
d) Seeding of urine on the microflora.
e) Cytological examination of urine.

11. Cystoscopic picture of hemorrhagic cystitis:

a) Mucus without gloss
b) Sharp diffuse hyperemia of the mucous membrane
c) Hyperemia in the area of the urinary triangle and bladder neck
d) Multiple rashes in the form of follicles
e) Areas of hemorrhages, surface erosions.

12. The main treatment for urethral stones:

a) Urethrolithoextraction
b) Urethrolitotomy
c) Vibrotherapy
d) Atmotherapy.

13. Indications for ureteral catheterization are all listed, except:

a) Separate collection of urine from each kidney
b) Retrograde pyelography and ureterography
c) Obturation anuria
d) Differential diagnosis of secretory and obturation anuria
e) Secretory anuria.

14. A complication of ureteral catheterization is:

a) Perforation of the ureters
b) Perforation of the renal pelvis
c) Exacerbation of urinary infection
d) Correct 1I 2
e) All listed.

15. A complication of urethral bulging of the urethra is all of the above, in particular:

a) Urethral fever
b) Acute prostatitis and epididymitis
c) Urethrorrhagia
d) Fornical bleeding.

CORRECT ANSWERS

1. puncture nephrolitholapoxia on the left and litholysis on the right 2. all of the above 3. slit-like eye of the ureter 4. fragment the stone, remove small fragments 5. ureter separation 6.ask the patient to urinate and then determine the amount of urine in the bladder by catheterizing it. 7. trabecular bladder. 8. injury to the urethra.	9. urinary tract ejection. 10. cystoscopy. 11. areas of hemorrhage, surface erosions. 12. rrethrolithoextraction. 13. secretory anuria. 14. everything is listed. 15. fornical bleeding.

RECOMMENDED LITERATURE

Basic

1. Urology : national textbook for students of higher medical educational institutions of the IVth levels of accreditation level / S. P. Pasiechnikov [et al.] ; ed. by: S. P. Pasiechnikov. - Vinnytsia : Nova Knyha, 2019. - 400 p.

Additional

1. Chen MD. History of Urethroplasty [Internet]. Timelineby Sanjay B, Kulkarni MS, FRCS and Mang L. Available from: https://strictureurethra.wordpress.com/article/history-of-urethroplasty/(cited 15 Dec 2015).
2. Kovalsky O., Mechev D., Danilevych V. Radiology. Radiotherapy. Diagnostic imaging. Vinnitsia 2013.
3. Manual of Medical Treatment in Urology / ed. by.: Ismaila A. Mungadi, Hyacinth N. Mbibu, E. Eltahawy. - India : Jaypee Brothers Medical Publishers (P) Ltd, 2014. - 162 p.
4. Nordio E. G. Radiological investigation of the urogenital system : tutorial on radiology for students of the international medical faculty / E. G. Nordio. – Zaporizhzhia : ZSMU, 2018. – 108 p/
5. On approval of clinical protocols in the specialty "Urology": Order No. 604 of the Ministry of health of Ukraine dated 06.12.2004 / Ministry of health of Ukraine [official. site.]. - URL: http://www.moz.gov.ua/ua/portal/dn_20041206_604.html
6. Paul Butler, Adam W. M. Mitchell and Harold Ellis Applied radiological anatomy for medical students. 2007.- p.159.
7. Silverman, Stuart G.; Cohan, Richard H. CT Urography an Atlas., 1st Edition 2007 , p. 273.
8. Urology. E.M.Shimkus,S.E.Shimkus./Simferopol, IAD CSMU, 2005.

List of sites:

1. https://helpiks.org/6-76245.html

2.https://pidru4niki.com/78877/meditsina/nevidkladna_dopomoga_urologichnih_zahvoryuvannyah

3. https://apn.co.ua/17/lectur.pdf

4.https://health-ua.com/news/65052-nevdkladna-urologya-v-praktitc-lkarv-hrurgchnogo-proflyu

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ’Я УКРАЇНИ
ЗАПОРІЗЬКИЙ ДЕРЖАВНИЙ МЕДИКО - ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ
КАФЕДРА УРОЛОГІЇ

М. А. Довбиш, І. М. Довбиш, О.М. Міщенко

СУЧАСНІ ДІАГНОСТИЧНІ, ЛІКУВАЛЬНІ, ЕНДОСКОПІЧНІ ТА ІНСТРУМЕНТАЛЬНІ МЕТОДИ В УРОЛОГІЇ

НАВЧАЛЬНИЙ ПОСІБНИК

Запоріжжя

2023

Рекомендовано до видання Центральною методичною радою
Запорізького державного медико-фармацевтичного університету
(протокол № від 2023 р.)

Автори:

М. А. Довбиш - професор кафедри урології ЗДМФУ, доктор медичних наук, професор;

І. М. Довбиш - асистент кафедри урології ЗДМФУ

О.М. Міщенко - асистент кафедри анатомії людини, оперативної хірургії та топографічної анатомії ЗДМФУ.

Рецензенти:

О. В. Капшитар – професор кафедри загальної хірургії та післядипломної хірургічної освіти ЗДМФУ, доктор медичних наук, професор;

В. І. Перцов – завідувач кафедри медицини катастроф, військової медицини та нейрохірургії ЗДМФУ, доктор медичних наук, професор.

Довбиш М. А.

Сучасні діагностичні, лікувальні, ендоскопічні та інструментальні методи в урології : навч. посібник / М.А. Довбиш, І.М. Довбиш, О.М. Міщенко – Запоріжжя: ЗДМФУ, 2023. – 95 с.