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Treatment of Single Kidney Stones and Differentiated Tactics (Literature Review)

Navruzov Elbek Ravshanovich, Navruzov Rustam Rashidovich
Tashkent Medical Academy Republic of Uzbekistan, Tashkent city,
Bukhara State, Medical Institute, Republic of Uzbekistan, Bukhara city

Relevance and relevance. Urolithiasis is a widespread urological disease that tends to increase in prevalence worldwide (Lee et al. 2021). Kidney stones are formed from a variety of minerals and salts, including calcium, oxalates, and uric acid, and can range in size from tiny particles to large stones that can cause urinary tract obstruction. The main pathophysiological cause of the formation of urinary stones is an oversaturation of urine salts (Moussa, Papatsoris, and Chakra 2021). Kidney and ureter stones are a serious health problem, as if left untreated, they can cause severe pain, urinary tract infections, and kidney damage even to the point of complete shriveling.

There are non-invasive and invasive treatments for kidney and ureter stones. Options for non-invasive treatment of kidney and ureteral stones include medication and extracorporeal shock wave lithotripsy.

Objective: To improve the results of surgical interventions in patients with single kidney stones by personalizing treatment tactics.

LITERATURE REVIEW

MochekamennaI bolezn odno fromsa m rasprostranennykh urologicheskikh zaboлеваний и встречalevy and occurs in 3-4‰ of all adultsoslogo navillages. Bolnye mochekamennoy boleznyu sostavlyavlyayut bolshinstvo patsientov urologicheskyx branches 30-45%. Pod ponyaniem urolithiaz bolshinstvo avtorov oo bounite the largest group of nonодн-dn orodny no theseologii and natogenesis of the syndromeomov i-bolezney, odnim from. clinicso-morfologicophenomena kotoryh is obrazovanie kon incrementov v oprr anax mochevydelitelnoth system. Zabolevaemost mocheckamennoy boleznyu continues to increase. Theseologia etogo zabolevania do sich por ostaremainsunclear [й 1].

Urolithiasis (urolithiasis) occupies one of the leading places in the structure of urological diseases in terms of the frequency of spread, hospitalized morbidity and place among the most frequent surgical diseases in patients who go to an ambulance and are admitted to an emergency hospital. ICD iso endemic all over the worldoxarakter i zanimaaet o dn одно of theamost important places in the structure of urologoy zabolevaemosti. Okolo 5-10 ‰ наof all the villagesoof the Evrpyas and Severns оуй Ameriki str aadaut urolithiazom [62].

Raspropageanenost mocheckamennoy bolezni (ICD) in children bar b ot 1% do 5%. Surgicalomethods for the treatment of ICD in children аналоare typical of surgicalогиям, испtechniques used in adults ohearing-extra a k o грооакорпо-ralnaI udapho-volnovai litotrypsia, ureterolithotripsy, retogradnai intrarenal surgery, percutaneous nephrolithotomy, litotoo mi with ispolzovaniem otopen ogo i laparoskopogo dostupoV. In the treatment of urolithiaza in children, metodoma ora ostaDUVL, odnako, rastet numo публикpublicationsnosacred ones othe use of aloinvasive techniques in children with large

coincrementsax mis used. The existencеществование описаof pisahh o go тренд otrenda o limits the effectiveness of thектуальностudy inавнении эффективноreducing the effectiveness and withoutonasnowithti DUVL in the treatment of large coooincrements in children. [4].

If do nolasto time ochovnoth goal of terapi urolithiumaza waso decrease in excretion with mohoy kameobraz ionov, to nophenomenon of citrathoth terapi pozvooolko reducethe level ofnasusheniya mochi litogenomic substancesa, no и пi noinfluence n a processoцесс otl o zheniyaokамней, влияя на ypomnei, affecting the level of pH mochi i na stabillost pastbopa. Boleee togo, zitheratnaI terapiya obespechivaet i rastvorenenie nekotorykh vidov already obrazovav kamnei. [61].

Riskaof developing infectionsonнin the hh o-vоспалительных осложнений после ЧПНЛ зависит olong-term complications after CPNL o - o t nalich infection inочевывothe respiratory tract withothe use of interventions aand b o zn o ven intra-and n o after отельства и возникновения интра- и послеofirst-hand explanations.ационных ослоIn thisregard, thereолитиазоare no long-term complications due to thepresence ofличием исходнend-day infection inочевывtherespiratory tract, intra-andopost-primaryacomplicationsонными осложнениями при выпin the discharge ofCPNL.обходимо oadd the tag " patient with a high risk of developing subsequent infections and long-term complications".осить к категории "пациентов с высоким риском развития послеоперационных инфекционно-воспалительных ослоTheазвитие инфекционнdevelopment of HH infections and long-в-спалительных ослоterm complicationsafterCPNL increasesathe durationofимотreatmentациентаbyo25%. [43].

Currently, most urologists write about the advantages of endoscopic treatment of urolithiasis (ICD) over open operations. We are actively developing new methods and modifications of surgical interventions aimed at further reducing invasiveness by performing manipulations through the natural urinary tract, which results in a reduction in the frequency of complications. [65].

Coralloid nephrolithiasis (CN) is a special form of ICD that attracts the most attention of urologists. A distinctive feature of CN is the large size of the stone with the presence of spurs filling the kidney's collector system, which affects its anatomy and functioning[77].

Taktica ofaleading the patientob with kamni in the upper moh tracts of takzhe has svoand owithobennostis. Firsto, они обусловлены длительностью зof all, theyare caused by the length of time spent at work,алевадecrease in the function of reserve functions, a decreaseнальных резервов inрганизмthe в целnumber ofм и пtarget and libraryfunctions, and астноrapid development ofазвитием остротheo system. pyelonephritisa, hasto принимаaccepting zlokachestvennyoe current with formirovanie of destructive form, a taaakzhenichem withoputstvuyushchy zabolevanii, including onkologicheskikh. Notobxodimo takeainto account and takoy demografichesky criterion, kak "perioood present life". [63].

KCyrillic and multiple stones have a variety of clinical symptoms, polymorphic clinical and radiological characteristics. In addition, the structure of the calyx-pelvis system, the presence or absence of its retention, the chemical composition of the stone, etc. is important. in this regard, the technique of performing percutaneous interventions has its own peculiarities[85].

Mini-percutaneous nephrolithotripsy can be considered a highly effective and safe method for the treatment of coralloid nephrolithiasis due to the minimization of the created access, an extremely small number of complications – primarily hemorrhagic. Due to the lack of injection of intrarenal pressure due to the free flow of irrigation fluid, inflammatory complications are also rare. The time spent on small fragmentation of the calculus is compensated by the fact that most of the fragments are independently evacuated from the renal cavity system when the renoscope is removed, so it is extremely rare to resort to forceps. [58].

In acute pyelonephritis, indications for open surgery are expanded. If the first signs of destructive pyelonephritis develop, a two-step management strategy is justified. Elderly patients can more easily tolerate initially performed percutaneous puncture nephrostomy, and the question of further stone removal surgery is postponed until the general condition improves [63].

More manageable changes in the pH of urine that are not associated with violations of the acid-base balance in the body as a whole can be obtained by using organic acids that are actively metabolized in the body, and their salts. Among such acids, citric acid is of the greatest interest, since it and its salts, in addition to their effect on pH, have a number of other effects that are very valuable for combating stone formation: in addition to the ability to bind calcium and stabilize solutions, citrates reduce the excretion of ammonium, increasing the solubility of complex magnesium-ammonium phosphates, inhibit the formation of calcium phosphate crystals, and they also increase the excretion of potassium, which has a beneficial effect on the solubility of urates. [61].

Amputatedsurgery for kidney and urinary tract abnormalities, especially ectopia of the kidney, is fraught with complications due to the high risk of damage to the abdominal vessels and requires extensive experience of the surgeon. [85].

Bolny withathe presence of exodnoth BMI, intraa-i noafteroper aaqion oslozhneniyami atothe removal of endoskopikicheskihinterventionsno po-vodu urolithiaza, notobhodimo ot present to k katago-rii "apatientob c absolute riskom razvitiya nosleoperaциts onnyh infectionsonno-vospalitelnyh oslozhneniy". Hastota posleoperachionnogo oslozhnennogo pielonephritea at endoskopom udalenii kamnei from the upper MVP sostavila 11.2%. 82.6% boflax oreduced pyelonephritisожненный пиелонефрит был ликвидирован консервативнowas eliminated, 17.4%отре- бовались допоof patients underwent long-term invasive interventions and intensive therapy, which, on average, increased оазивные вмеша- тельства и интенсивнthe content ofя терапия, что, в среднем, увеличило пребывание пациента in stacionare n a is60%. [6].

When determining the indications for LVL of stones with dimensions of 1.5-2 cm, it is necessary to take into account the volume of the stone and its location in the calico-pelvic system, since this determines the possibility of forming a "stone path" after LVL, which is especially important in the recurrent nature of nephrolithiasis, taking into account both age-related changes in upper and lower urinary tract motility, and postoperative scarring changes. If a patient has benign prostatic hyperplasia (BPH), there may be difficulties both in preoperative drainage of the upper urinary tract and in the removal of fragments in the postoperative period. It is also necessary to take into account the patient's history of pelvic surgery. [63]

Under the influence of various combinations of exogenous, endogenous and genetic factors, there is a violation of metabolism in biological environments, which is accompanied by an increase in the level of stone-forming substances (calcium, uric acid, etc.) in the blood serum. An increase in stone-forming substances in the blood serum leads to an increase in their excretion by the kidneys, as the main organ involved in maintaining homeostasis, and to an oversaturation of urine [62].

Recentотря на имеющиеся успехи в изучении внутри- бprogress in the study ofintrahospital infections and the widerangeofo проводимые в боль- ничных стационарах санитарossible primary health conditions-hygienic and epidemiological measureso-гигиенические и проти-воэпидемические меро, her problem is still being solved.облема всё ещё остается актуальноProblema nosocomialoooth infec-tion atobretaet vawnoe znachenie v obschestvennom zdravoohranenii, not tolco v promyshlennno razvitykh, no i v razvivaThis is a pageanax, where medical and coqi - aflaxo-ekonomical noconsequences ot itsounsolved problems are severe and mnogobrazn. In очередь они суще- ственно снижают безопасность и качество медицинской помощи населению, что проявляется увеличением пока- зателей летальности, развития the first turn, there is no significant decrease in the number of children without medical services, which is an increase in the number of years of life oslozh, lengthening of the wedokoinathe

presence of boflax in the stacionare, udorow a niaaof the stoimosti boflaxoy koyki, a takzh v novyshennnoy za- bolevaemosti meditsinskomogo personala [8].

Due to the palliative nature of surgical treatment of ICD, whether it is an open operation or DUVL, it is important to use treatment methods that suppress the process of stone formation or affect the already formed stone. [63].

Correction ofparameters based on practical skills of working with the device, namely: pulse power, frequency of their repetition and the type of probe-can significantly increase the efficiency of lithotripsy, make it personalized, taking into account the localization of the stone, its density and the presence of complications, as well as make reasonable use of the resource of the probes. [80]

A decrease in the acidity of urine with a pH approaching 6.6-6.8 provides an increase in the solubility of the largest number of stone-forming compounds. This increases the solubility of urates, mixed urate oxalates (with the best effect when the content of oxalates is up to 25%), oxalates and calcinates, hydroxyapatites and some other phosphates. The simplest way to alkalize urine is to take hydroxycarbonate (bicarbonate, bicarbonate) salts. However, this method is not always effective due to the fact that to obtain significant shifts in the pH of urine, it is necessary to use such doses of bicarbonates, which are associated with the possibility of violations of the acid-base balance in the body, as well as gross changes in the concentration of potassium and sodium in the urine. In addition, alkalinization of urine, which leads to an increase in the solubility of some compounds, can stimulate the crystallization of others, which requires additional measures to stabilize the solution, especially with poorly dosed changes in the pH of urine caused by bicarbonates. [61].

Frequent complications of percutaneous treatment of patients with kidney stones are the occurrence of acute or increased chronic pyelonephritis, intra-or postoperative bleeding, and the withdrawal of nephrostomy drainage. [85]

Одной из этиолоOne of the etiological causes of formirovaniya kamnei mochev o g ooro bladder is migraation kamnei from the upper moh tracts. Tak vовais studied at the F. T. Hammad Research Institute and withoatues. 33% ofthepatientsов с камнями мочевого had mnestic indications of renal анамнестические colic. Iнашем исследовании анамнестические указания на наличие kour study, only 12.7% ofнкрементpatients had mnestic abnormalities in theupperorespiratorytract. [90].

Modern methods of treating urolithiasis, in most cases, can save the patient from a urinary stone (calculus). However, a significant number of residual stones in the urinary tract, especially after remote lithotripsy, the severity of the chronic inflammatory process in the urinary tract, and metabolic changes in the body require appropriate correction [64].

PNLL is the most optimal method of surgical treatment of patients with any form of CI, which, if necessary, is supplemented with other minimally invasive interventions; open operations (including laparoscopic ones) are performed in cases where nephrectomy is indicated; DLT, as monotherapy, is impractical in this category of patients, even if the kidney is previously stented. [77].

In a supersaturated solution, salt precipitation is observed in the form of crystals, which can later serve as a factor in the formation of microliths, and then, due to the deposition of new crystals, the formation of urinary stones. However, the urine is often saturated with salts due to changes in the nature of nutrition or changes in climatic conditions, but the formation of calculi does not occur. The presence of only one oversaturation of urine is not sufficient for the formation of a concretion [62].

Urolithiasis is one of the forms of manifestation of metabolic diseases, which, according to the forecast of scientists, will have a further upward trend due to significant changes in the nature and quality of human nutrition, an increase in the number of adverse environmental and social

factors that have both direct and indirect effects on the human body. The urgency of the problem of urolithiasis is due to the fact that in 65-70% of cases, the disease is diagnosed in people aged 20-55 years, i.e. in the most able-bodied period of life [29].

The main, simplest and most universal way to prevent stone formation, mandatory for ICD, is to dilute urine by increasing fluid intake. In most cases, it is necessary to maintain a daily diuresis of 2.5 l. However, although an increase in diuresis can slow down stone formation, it is not enough to dissolve already formed stones. In addition, for many patients with concomitant cardiovascular diseases, the consumption of such a volume of liquid is contraindicated. [63].

A typical symptom in the presence of bladder stones is frequent and painful urination, which can occur in 40-50% of patients. In 30-40% of patients, intermittent urination may occur [90].

Увеличение средней продолжительности жизни людей (70 лет к 2015 гAn increase in the average life expectancy of people (70 years by 2015)арение популяции в целом, pand adecrease in the population in whole,о возрастные рамки уролитиahealthyalifestyle [130]. Sklonnost k etomu zabolevaniu not tolco persons naibo leeelaborosposobnogo vozrasta, no I boleee noresidential, nolietiolothe absenceарактер его, отсутствие радикаof specific meth-odsодоin treatment indicates o necothat there is no evidence of a problem.ой актуальности данной проблемы.

It was found that the larger the diameter of the discharge head of the probe, the higher the efficiency of crushing. This can be explained primarily from the standpoint of the physics of the phenomenon. The larger the diameter of the discharge head of the probe, the greater the insulation thickness between the two electrodes of the head and, accordingly, the length of the spark channel, which leads to an increase in pulse power. Since the work that goes into destroying an object is directly proportional to the power and number of pulses, increasing the power at constant output voltage values on the device allows you to destroy objects more efficiently, i.e. with a smaller number of pulses. This was confirmed in the second part of the work, where a reliable relationship was revealed between the decrease in the number of pulses required for the destruction of a stone sample, as the pulse power increases. In actual operation, this will increase the efficiency of crushing by changing the probe to a larger diameter probe, if this is technically feasible, or by increasing the power of the outgoing electrical pulse within safe limits (up to 1 J), or by combining both methods. [80].

It should be noted that when performing endoscopic interventions for nephrolithiasis, complications that pose a danger to the patient's life are often observed. Therefore, the time has come when, in order to prevent them, it is necessary to switch from quantitative to qualitative assessment, i.e. complications should be systematized and evaluated by severity, taking into account the type and scope of treatment measures aimed at their elimination [65].

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