Research Article

ISSN: 3066-6538

Surgery and Clinical Practice

Current Status of Urolithiasis Metaphylaxis in the Russian Federation

Malkhasyan VA[1,2], Gazimiev MA[3], Martov AG[4], Gadzhiev NK[5], Sukhikh SO[1,2]*, Grigoryan BL[1,2] and Pushkar DYu[1,2]

[1]*Urology Department of Russian University of Medicine, Moscow, Russian Federation.*

[2]*Botkin Hospital Moscow Urology Center, Moscow, Russian Federation.*

[3]*I.M.Sechenov First Moscow State Medical University (Sechenov University), Moscow, Russian Federation.*

[4]*A.I. Burnazyan SRC FMBC, FMBA of Russia, M.V. Lomonosov Medical Research and Educational Center Moscow State University, Moscow, Russia.*

[5]*N.I.Pirogov High Medical Technologies Clinic, Saint Petersburg State University, Saint Petersburg, Russian Federation.*

***Correspondence:**
Sergey Sukhikh, Botkin Hospital Moscow Urology Center, 2nd Botkinsky pr-d, 5, Moscow, 125284, Russian Federation.

Received: 01 Mar 2025; **Accepted:** 05 Apr 2025; **Published:** 18 Apr 2025

Citation: Malkhasyan VA, Gazimiev MA, Martov AG, et al. Current Status of Urolithiasis Metaphylaxis in the Russian Federation. Surg Clin Prac. 2025; 2(1): 1-5.

ABSTRACT

Introduction: *Urolithiasis is the most common urological disease in the adult population. In view of the high risk of recurrence and repeated surgical interventions, the issue of metaphylaxis of urolithiasis measures aimed at preventing recurrent stone formation is of great importance and is a focus of the professional community.*

Materials and Methods: *An anonymous survey was conducted among Russian urologists to study the current state of the problem of metaphylaxis of urolithiasis. A 25-item questionnaire was sent by e-mail to more than 4116 Russian urologists. A total of 1,238 specialists completed the survey. The dataset compiled from the responses received was processed and presented as descriptive statistics in the form of tables and diagrams.*

Results: *According to the survey, more than half of the 831 specialists (67.1%) specialized in the treatment of urolithiasis. A total of 626 (86%) inpatient urologists and 205 (40%) outpatient urologists specialized in the treatment of urolithiasis. A total of 1180 (96.8%) respondents practised the prevention of recurrent stone formation, but only 336 (28.47%) performed a comprehensive metabolic examination for all patients, followed by a prescription for drug therapy and an appropriate diet.*

Conclusions: *Adherence to international clinical guidelines in terms of specific prevention of recurrent stone formation and dissolution therapy in Russia is low. The development and approval of national clinical recommendations should contribute to a more active use of preventive measures by urologists and the introduction of missing methods into the social insurance program.*

Keywords

Urolithiasis, Metaphylaxis, Dissolution therapy, Recurrent stone formation.

Introduction

Urolithiasis is one of the most urgent problems in modern medicine. According to current data, the cost of caring for patients with urolithiasis is approximately $2 to $5 billion per year [1,2]. Currently, there is a steady upward trend in the incidence of urolithiasis [3-8]. In Europe, the average prevalence of this pathology is 2–20%, and the risk of urolithiasis in the USA is between 5 and 12% [9]. In Russia, in recent decades, there has also

been a trend towards an increase in the number of patients with urolithiasis [10-12]. Symptoms of urolithiasis that require surgical treatment can be observed in 28–48% of patients [13-15]. This is most likely the reason for the steady recorded increase in planned and emergency hospitalizations of patients with urolithiasis [16-18]. The socioeconomic importance of the problem is due to the high incidence of urolithiasis among people of working age [17-23], and several studies have recorded a trend towards a decrease in the average age of patients with urolithiasis [19-22]. The high prevalence and increase in the incidence of urolithiasis in Russia cause a heavy burden on the health care system and the number of beds for urological services. According to data from all statistical Russian reports for 2009–2010, 42.9% of patients hospitalized for emergencies were admitted with a diagnosis of urolithiasis [11]. According to data for the same period, in 2009 in Russia, of the 366,170 treated patients with urolithiasis, 50.2% were hospitalized due to emergencies. At the same time, patients with urolithiasis in 2009 spent 3,295,698 days in the hospital, which represented 46% of all bed days spent by urological patients during this year. A characteristic feature of urolithiasis is its tendency to recur. Thus, in the absence of proper metaphylaxis, the risk of recurrence and repeated surgical interventions is 25–50% within 5 years and 60–75% within 10 years [24,25]. According to the ROKS (Recurrence of Kidney Stone) risk nomogram, this indicator is 11% at 2 years, 20% at 5 years, 31% at 10 years and 39% at 15 years [26]. In turn, active metaphylaxis of urolithiasis is quite effective and can reduce the risk of recurrence by approximately 50% [4,27,28] and reduce the number of emergency visits and surgical care visits by 40 and 20%, respectively [29]. Nevertheless, a preliminary analysis of the current situation revealed an extremely passive attitude of Russian urologists regarding the conservative treatment of urolithiasis and the implementation of measures aimed at preventing the growth of stones and their reformation. In this regard, it seems relevant to conduct a large-scale analysis of the current situation to identify the reasons that prevent the full and widespread introduction of metaphylactic measures into routine clinical practice.

Research Goals and Objectives

1. To study adherence to the clinical recommendations of Russian urologists in terms of stone analysis, specific metabolic evaluation and the use of dissolution therapy and nondrug prevention.
2. To identify the reasons for the lack of use of stone analysis, specific metabolic evaluation, dissolution therapy, and nondrug prevention of recurrent stone formation.
3. To formulate proposals aimed at eliminating the causes preventing the use of stone analysis, specific metabolic evaluation, dissolution therapy, oral chemolysis and nondrug prevention of stone formation.

Materials and Methods

We developed an electronic questionnaire containing a list of questions related to the use of stone analysis, specific metabolic evaluation, dissolution therapy, oral chemolysis (citrate mixture consisting of citric acid, potassium bicarbonate, sodium citrate – «Blemaren») and nondrug prevention of stone formation in the routine practice of urologists. The link to the electronic questionnaire, which included 25 questions along with a cover letter from the senior urologist of the Ministry of Health of the Russian Federation, was sent by e-mail to Russian urologists through the database of the Russian Society of Urology, which included a total of 4116 current email addresses.

Results

The questionnaire was completed by 1,238 urologists. The largest number of responses was received from the Central Federal District and the smallest from the North Caucasian Federal District (Table 1).

Table 1: Distribution of respondents by district.

Federal district	Number of respondents	Percentage of respondents
Central Federal District	497	40,1%
Volga Federal District	200	16,2%
Siberian Federal District	158	12,8%
Southern Federal District	108	8,7%
Northwestern Federal District	90	7,3%
Far Eastern Federal District	70	5,7%
Ural Federal District	79	6,4%
North Caucasian Federal District	36	2,9%

At the time of questionnaire completion, 393 (31.7%) respondents were hospital employees, 510 (41.2%) were outpatient office employees, and 335 (27.1%) worked in both a hospital and an outpatient office (Figure 1).

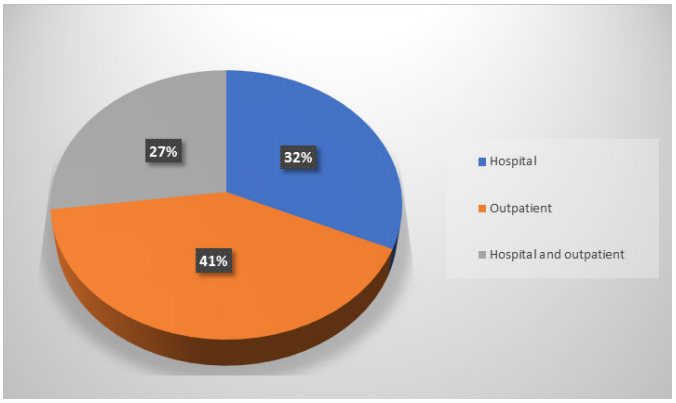

Figure 1: Distribution of respondents by type of practice.

At the time of questionnaire completion, 648 (52.3%) of the respondents worked in a public institution, 234 (18.9%) in a private medical organization, and 356 (28.8%) worked in both public and private institutions. According to the results of the questionnaire, 831 (67.1%) respondents stated that they specialized in the treatment of urolithiasis, 388 (31.3%) reported that urolithiasis treatment was not their main specialty, and 19 (1.5%) reported that they did not deal with patients with urolithiasis; for this reason, the responses of this category of specialists were excluded from further analysis. A total of 626 (86%) urologists who worked in a hospital and 205 (40%) urologists who worked in outpatient

clinics specialized in the treatment of urolithiasis (Figure 2).

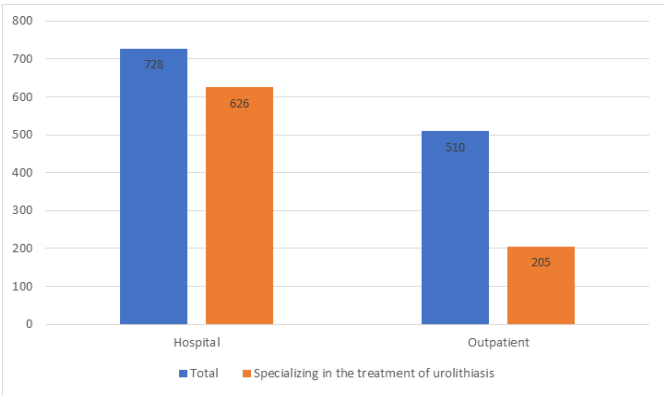

Figure 2: Distribution of hospital and outpatient urologists specializing in the treatment of urolithiasis.

Among urologists involved in the surgical treatment of urolithiasis, 521 (69.6%) reported that they gave the patient a stone fragment for stone composition examination in more than half of the cases, 86 (11.5%) urologists gave the patient a stone fragment in less than half of the cases, 72 (9.6%) urologists performed this for less than a third of the cases, and 69 (9.2%) specialists admitted that they gave a stone fragment only to every tenth patient.

Among all urologists involved in the treatment of urolithiasis, 516 (68.98%) named the stone dusting into fragments, the size of which did not allow for analysis, as the main reason for not providing a fragment of the extracted stone to the patient, 116 (15.51%) of urologists considered the main reason to be non-preservation of fragments by paramedical personnel, and 123 (16.44%) urologists believed that the main reason was the lack of sufficient motivation on the part of the patient to implement metaphylaxis measures.

A total of 192 (25.67%) specialists reported that more than 50% of patients turned to them for preventive measures informed by stone composition data, 174 (23.26%) responded that less than a third of the patients came with the results of the stone analysis, and 382 (51.07%) specialists admitted that less than 10% of the patients came with the results of the stone composition examination. As one of the main reasons for not performing stone composition examination, 877 (70.84%) specialists indicated the unavailability of analysis within the framework of social insurance, 503 (40.63%) specialists indicated the patient's satisfaction with the results of minimally invasive surgical treatment and the lack of sufficient motivation to conduct comprehensive examinations, taking medications aimed at preventing stone reformation and changing their usual lifestyle, and 276 (22.29%) respondents reported insufficiently informing the patient about the effectiveness of metaphylactic measures.

A total of 1021 (83.76%) specialists did not have the opportunity to perform stone composition examinations in their institution, and among 198 (16.24%) specialists, only 31 (2.54%) could perform stone analysis within the framework of social insurance; 1180 (96.8%) respondents practised prevention of recurrent stone formation.

In the framework of urolithiasis metaphylaxis in most cases, 844 (71.52%) specialists contented themselves with general recommendations, and only 336 (28.47%) performed a comprehensive metabolic evaluation for all patients, followed by stone-specific pharmacological recurrence prevention and dietary recommendations (Figure 3).

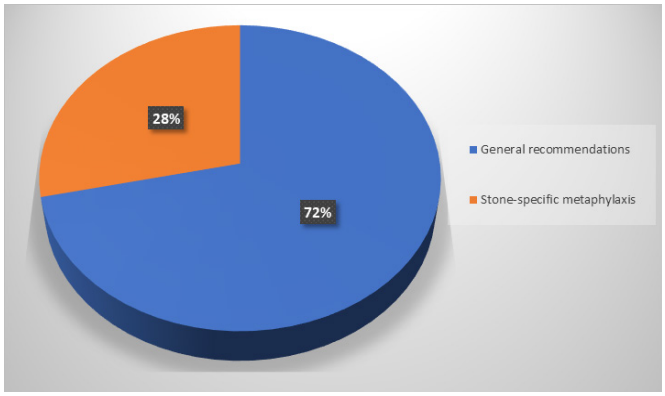

Figure 3: Percentage of urologists who recommended stone-specific metaphylaxis of urolithiasis.

The opportunity to perform a comprehensive metabolic evaluation was available to 434 (35.6%) respondents at their institution, and only 199 (16.32%) were able to perform it within the framework of the social insurance program. At the same time, 1050 (86.14%) specialists were sure that a comprehensive metabolic evaluation and a stone composition examination should be covered by social insurance programs in all institutions that treated patients with urolithiasis. A total of 1,106 (90.73%) specialists referred to high fluid intake as the most effective preventive measure, 1,002 (82.2%) referred to diet, 980 (80.39%) referred to the use of alkaline citrates, 595 (48, 81%) referred to sodium intake restriction, 589 (48.32%) referred to xanthine oxidase inhibitors, and 174 (14.27%) referred to thiazide diuretics. Among the main reasons why urologists did not practice comprehensive stone-specific recurrence prevention, 766 (62.84%) specialists indicated insufficient motivation of patients for complex examination, long-term treatment, and lifestyle changes, 291 (23.87%) described the limited length of time for specialists to engage in metaphylaxis, 139 (11.4%) credited a low level of confidence in their own competence and 158 (12.96%) believed that the primary efforts and time of urologists were spent on improving competencies in the surgical treatment of urolithiasis. According to the data obtained, alkaline citrates and xanthine oxidase inhibitors were the most prescribed drugs for the prevention of recurrent stone formation (Table 2).

Of the interviewed specialists, 1158 (95%) practised dissolution therapy of uric acid stones with citrates (citrate mixture consisting of citric acid, potassium bicarbonate, sodium citrate – «Blemaren»), only 542 (46.8%) practised this as a first-line treatment, and 616 (53.2%) practised this as a postsurgical dissolution of residual

stone fragments. At the same time, 118 (9.68%) specialists were ready to prescribe dissolution therapy for a stone size greater than 3 cm, 119 (9.68%) believed that the maximum allowable stone size for oral chemolysis was 3 cm, 299 (24.53%) were ready to offer the patient dissolution therapy for a stone no larger than 2 cm, 542 (44.46%) would attempt to dissolve only stones smaller than 1 cm in size, and 141 (11.57%) would not offer dissolution therapy to a patient if the stone was larger than 5 mm. Eighty-five (6.97%) specialists prescribed therapy with alkaline citrates for a maximum duration of up to 4 weeks, 96 (7.88%) did not prescribe alkaline citrates for more than 6 weeks, 188 (15.42%) limited the duration of therapy with alkaline citrates to 8 weeks, 358 (29.37%) considered 12 weeks as the maximum allowable duration of treatment with alkaline citrates, 277 (22.72%) were ready to prolong alkaline citrate therapy to 24 weeks, and 215 (17.64%) believed that the duration of alkaline citrate therapy should not be limited in terms of time.

Table 2: Most frequently prescribed drugs for the prevention of recurrent stone formation among the interviewed specialists.

Drug	Number of urologists prescribing the drug	%
Alkaline citrates	934	76,6
Allopurinol	913	75
Febuxostat	140	11,5
Vitamin D	447	36,7
Magnesium medicines	326	26,7
Thiazide diuretics	296	24,3
Methionine	282	23,1
Calcium supplements	98	8
Sodium bicarbonate	49	4

Discussion

According to the results of our survey, more than half of the respondents (59%) were employees of a urological hospital, while 41% had an exclusively outpatient practice. A total of 98.5% of the respondents were involved in the treatment of urolithiasis in one form or another, while 67% specialized in the treatment of urolithiasis. Notably, an extremely small proportion of outpatient urologists specialized in the treatment of urolithiasis. Thus, in contrast to 86% of hospital urologists who treated urolithiasis, only 40% of outpatient urologists reported that they specialized in the treatment of urolithiasis. Approximately 70% of surgeons gave the patient a stone fragment for stone composition examination in most cases. However, it should be noted that in approximately one-third of cases, it was extremely rare to provide a stone fragment to the patient. Sixty-nine percent of respondents believed that the main reason why the patient did not receive a stone fragment and therefore was unable to perform its analysis was stone dusting to a size that did not allow its analysis. This situation is most likely related, on the one hand, to the wide introduction into surgical practice of laser technologies, which perform stone dusting, and on the other hand, to the unwillingness of urologists to use expensive disposable devices for stone fragment retrieval. Few patients performed a stone composition examination. Thus, only a quarter of the specialists interviewed noted that most patients had already turned to them for the prevention of recurrent stone formation with the results of stone composition examinations. The reason for this was considered by 72% of respondents to be the extremely low availability of stone analysis within the framework of social insurance. Among all respondents, only 16% had the opportunity to perform the stone composition examination in their institution, and only 2.5% had the opportunity to perform the analysis within the framework of the social insurance program. Despite the large proportion of specialists (97%) involved in the prevention of recurrent stone formation, only 27.5% of urologists performed a comprehensive metabolic evaluation of patients with subsequent stone-specific recurrence prevention. The reason for this situation is most likely also associated with the low availability of a comprehensive metabolic evaluation in the clinics. In our survey, only 35.6% of respondents had the opportunity to perform an analysis and only 16.3% could perform it within the framework of the social insurance program. This is probably the reason for the low levels of participation of outpatient urologists in the treatment of urolithiasis. Most of the respondents considered the patient's low motivation for a comprehensive evaluation, complex therapy, and a change in their usual lifestyle one of the significant factors in the low adherence to clinical recommendations for stone recurrence prevention. On the one hand, the reason for this may be the patient's high satisfaction with the results of minimally invasive interventions, which allows them to manage the stone problem within one or two days; on the other hand, the patient may be demotivated by the low availability of diagnostic methods. Based on this, the introduction of comprehensive guidelines on stone recurrence prevention that include recommendations for performing a stone composition examination and a comprehensive metabolic evaluation will entail a revision of the standard of care for patients with urolithiasis and will contribute to the emergence in medical institutions of the possibility of performing stone analyses covered by state-sponsored insurance, which will significantly increase the availability of these diagnostic methods.

Less than half of the respondents (46%) considered dissolution therapy for uric acid stones as an alternative to surgical treatment and first-line therapy. Attention is also drawn to the lack of a common understanding of both the allowable size of the dissolved stone and the maximum allowable duration of therapy with alkaline citrates. From this point of view, the introduction of a detailed algorithm for the oral chemolysis of uric acid stones into the clinical guidelines should improve the situation (citrate mixture consisting of citric acid, potassium bicarbonate, sodium citrate – «Blemaren») [30].

One limitation of this study was the insufficient coverage of urologists who participated in the survey. Furthermore, onco-urologists who were not involved in the treatment of patients with urolithiasis could complete the questionnaire. We also assumed that all hospital specialists were involved in the surgical treatment of urolithiasis; however, no information regarding the level of treatment was available.

Conclusion

Adherence to international clinical guidelines in terms of specific prevention methods for recurrent stone formation and dissolution therapy in Russia is low. The main reasons for this are the low availability of analyses of stone composition and metabolic research within the framework of the social insurance program, the low motivation of patients to comply with recommendations aimed at preventing recurrent stone formation, and the lack of a unified approach to dissolution therapy. The development and approval of national clinical recommendations containing step-by-step algorithms (mandatory for implementation) should contribute to a more active use of preventive measures by urologists and the introduction of missing methods into the social insurance program.

References

1. Ghani KR, Roghmann F, Sammon JD, et al. Emergency department visits in the United States for upper urinary tract stones: trends in hospitalization and charges. J Urol. 2014; 191: 90-6.
2. Pearle MS, Calhoun EA, Curhan GC. Urologic Diseases of America Project. Urologic diseases in America project: urolithiasis. J Urol. 2005; 173: 848-57.
3. Romero V, Akpinar H, Assimos DG. Kidney stones: a global picture of prevalence, incidence, and associated risk factors. Rev Urol. 2010; 12: e86-96.
4. Stamatelou KK, Francis ME, Jones CA, et al. Time trends in reported prevalence of kidney stones in the United States: 1976-1994. Kidney Int. 2003; 63: 1817-23.
5. Scales CD Jr, Smith AC, Hanley JM, et al. Urologic Diseases in America Project. Prevalence of kidney stones in the United States. Eur Urol. 2012; 62: 160-5.
6. Edvardsson VO, Indridason OS, Haraldsson G, et al. Temporal trends in the incidence of kidney stone disease. Kidney Int. 2013; 83: 146-52.
7. Hesse A, Brändle E, Wilbert D, et al. Study on the prevalence and incidence of urolithiasis in Germany comparing the years 1979 vs. 2000. Eur Urol. 2003; 44: 709-13.
8. Trinchieri A, Coppi F, Montanari E, et al. Increase in the prevalence of symptomatic upper urinary tract stones during the last ten years. Eur Urol. 2000; 37: 23-5.
9. Picozzi SC, Marenghi C, Casellato S, et al. Management of ureteral calculi and medical expulsive therapy in emergency departments. J Emerg Trauma Shock. 2011; 4: 70-6.
10. Gadzhiev N, Prosyannikov M, Malkhasyan V, et al. Urolithiasis prevalence in the Russian Federation: analysis of trends over a 15-year period. World J Urol. 2021; 39: 3939-3944.
11. Krivonos OV, Skachkova EI, Malkhasian VA, et al. [Current state, challenges and prospects for the development of the Russian urological service]. Urologiia. 2012; 5: 5-12.
12. Apolikhin OI, Sivkov AV, Moskaleva NG, et al. Analysis of uronephrological morbidity and mortality in the Russian Federation over a ten-year period (2002-2012) according to official statistics. Experimental and Clinical Urology. 2014; 2: 4-12.
13. Dropkin BM, Moses RA, Sharma D, et al. The natural history of nonobstructing asymptomatic renal stones managed with active surveillance. J Urol. 2015; 193: 1265-9.
14. Koh LT, Ng FC, Ng KK. Outcomes of long-term follow-up of patients with conservative management of asymptomatic renal calculi. BJU Int. 2012; 109: 622-5.
15. Glowacki LS, Beecroft ML, Cook RJ, et al. The natural history of asymptomatic urolithiasis. J Urol. 1992; 147: 319-21.
16. Curhan GC. Epidemiology of stone disease. Urol Clin North Am. 2007; 34: 287-93.
17. Fwu CW, Eggers PW, Kimmel PL, et al. Emergency department visits, use of imaging, and drugs for urolithiasis have increased in the United States. Kidney Int. 2013; 83: 479-86.
18. Turney BW, Reynard JM, Noble JG, et al. Trends in urological stone disease. BJU Int. 2012; 109: 1082-7.
19. Coe FL, Parks JH, Asplin JR. The pathogenesis and treatment of kidney stones. N Engl J Med. 1992; 327: 1141-52.
20. ambeck AE, Lieske JC, Li X, et al. Effect of age on the clinical presentation of incident symptomatic urolithiasis in the general population. J Urol. 2013; 189: 158-64.
21. Hiatt RA, Dales LG, Friedman GD, et al. Frequency of urolithiasis in a prepaid medical care program. Am J Epidemiol. 1982; 115: 255-65.
22. Strope SA, Wolf JS Jr, Hollenbeck BK. Changes in gender distribution of urinary stone disease. Urology. 2010; 75: 543-6.
23. Cupisti A, Pasquali E, Lusso S, et al. Renal colic in Pisa emergency department: epidemiology, diagnostics and treatment patterns. Intern Emerg Med. 2008; 3: 241-4.
24. Saigal CS, Joyce G, Timilsina AR. Direct and indirect costs of nephrolithiasis in an employed population: opportunity for disease management? Kidney Int. 2005; 68: 1808-14.
25. Tiselius HG. Who Forms Stones and Why? Eur Urol. 2011; 10: 408–14.
26. Rule AD, Lieske JC, Li X, et al. The ROKS nomogram for predicting a second symptomatic stone episode. J Am Soc Nephrol. 2014; 25: 2878-86.
27. Lieske JC, Peña de la Vega LS, Slezak JM, et al. Renal stone epidemiology in Rochester, Minnesota: an update. Kidney Int. 2006; 69: 760-4.
28. Ferraro PM, Curhan GC, D'Addessi A, et al. Risk of recurrence of idiopathic calcium kidney stones: analysis of data from the literature. J Nephrol. 2017; 30: 227-233.
29. Dauw CA, Yi Y, Bierlein MJ, et al. Medication Nonadherence and Effectiveness of Preventive Pharmacological Therapy for Kidney Stones. J Urol. 2016; 195: 648-52.
30. Clinical recommendations Urolithiasis of the Ministry of Health of the Russian Federation 2020 working group Martov A.G. et al. Russian.
31. Sayenko VS, Pesegov SV. Interdisciplinary approach to the prevention of relapses of urolithiasis. Urology. 2020; 5: 87-92.