EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6972

KIDNEY STONES AND THEIR TREATMENT MEASURES

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Abstract
This scientific article presents a scientific analysis of the prevalence, etiology, pathogenesis, clinical symptoms, diagnostic methods, and modern treatment of kidney stones (nephrolithiasis). According to research, early detection of kidney stones reduces the rate of complications by 60-70%. The article also compares and analyzes the effectiveness of dietary, drug, and minimally invasive surgical approaches.

Keywords: kidney stone disease, nephrolithiasis, lithotripsy, diet therapy, urinalysis, prevention.

Introduction

Relevance

Today, the environmental situation, minerals in water, hot climate, and nutritional disorders are leading to an increase in urolithiasis.
According to epidemiological observations conducted by the Ministry of Health of the Republic of Uzbekistan in 2024:
General incidence rate: 23.2%
Among men: 13.8%;
Among women: 9.4%;
Recurrent cases: 21.5%
These indicators scientifically substantiate the need for early prevention of the disease and an individual approach.

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The purpose of the study is to analyze the causes, clinical symptoms, diagnostic methods, and modern treatment measures of urolithiasis, as well as to identify ways to prevent the recurrence of the disease through diet and prevention.

Urolithiasis is a chronic, relapsing metabolic disease characterized by the presence of stones (concrements) in the urinary system, that is, in the kidneys, bladder, and urinary tract. Sometimes the terms urolithiasis and nephrolithiasis are used synonymously, but nephrolithiasis can only be called the presence of stones in the kidneys (and not in other parts of the urinary system).

The main cause of the onset and development of urolithiasis is a metabolic disorder, which leads to the formation of insoluble salts that form stones. The number of stones and their location can be very different. Urolithiasis accounts for 30-40% of the reasons for hospitalization in the urological department of hospitals.

Poor water or monotonous nutrition, climatic features of the region where a person lives, for example, a very hot climate, taking certain medications, abnormalities of the urinary system and strictures of the urinary tract, hyperparathyroidism, vitamin A and D deficiency, chronic inflammatory diseases of the urinary system (pyelonephritis, cystitis), as well as hereditary factors can also lead to the development of urolithiasis.

Stones are divided into several types depending on the causes of their formation and composition:

calcium up to	70%;
uric acid up to	12%;
infected up to	15%;
cystine up to	2-3%.

Symptoms of the Disease

Depending on the location of the stone, the patient may experience various symptoms, the main symptoms for this disease are:

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Paroxysmal pain. Kidney stones and stones in the upper part of the bladder are usually characterized by pain under the ribs in the back or side. The pain can be severe and intractable, and its intensity can vary with a frequency of 20-60 minutes. Often, the onset of pain is triggered by physical stress, drinking a large amount of fluid, or taking diuretics. As the stone moves through the urinary tract, the location of the pain changes, moving from the lower back to the abdomen, perineum, inner thighs, and groin. These symptoms are often accompanied by the urge to urinate. It is important not to confuse renal colic with acute surgical diseases, such as acute appendicitis, acute cholecystitis, acute pancreatitis, intestinal obstruction, hernial stricture, ectopic pregnancy, duodenal ulcer. Therefore, if these symptoms occur, it is necessary to immediately consult a doctor and determine the cause of the disease as soon as possible.

Blood in the urine. Renal colic is often preceded by blood in the urine in cases of urolithiasis. Cloudy or foul-smelling urine with sediment may also indicate the displacement of a stone.

Deterioration of the general condition, especially nausea, vomiting. These symptoms are especially characteristic of the onset of inflammation - pyelonephritis.

Sand or stone passage - when a stone passes, nausea and high fever may occur.

Examinations Performed in Case of kidney stones.

If the above complaints occur, it is necessary to consult a urologist who, if necessary, will prescribe additional examinations and decide on further treatment.

The basic examination includes:

• Collecting anamnesis, examining the patient;

• General blood and urine analysis

Ultrasound examination of the urinary tract. This non-invasive, safe, and painless examination method can be used several times for dynamic monitoring during treatment;

Visual and excretory urography

Additional tests may include: Multispiral computed tomography: This allows you to see the stone, calculate its density, size, the architecture of the urinary system, and the condition of the surrounding tissues. If necessary, 3D reconstruction can be performed.

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Dynamic and static nephroscintigraphy, which allows you to study kidney function and the degree of its deterioration. Urine culture with sensitivity to antibiotics can determine the degree of urinary tract infection and inflammation.

Kidney Stone Treatment

After receiving the examination results, the urologist determines the treatment tactics for a specific clinical condition. Today, urologists have a variety of treatment methods in their arsenal, including:

Medications aimed at the independent passage of stones;

Drug treatment aimed at dissolving the stone;

• Open surgical interventions;
• Remote shock wave lithotripsy;
• Endoscopic contact lithotripsy;
• Percutaneous nephrolithotripsy;
• Endoscopic surgical interventions.

Until recently, open surgical procedures were considered the leading method in the treatment of urolithiasis, but due to the development of medical equipment, they have become secondary and are now used only when there are strict indications. More importance is being given to minimally invasive methods such as remote shock wave lithotripsy, endoscopic methods (contact lithotripsy), and percutaneous nephrolithotripsy.

The “gold standard” for the treatment of urolithiasis is remote shock wave lithotripsy, which allows you to remove 90% of stones in the urinary system of any localization. During remote shock wave lithotripsy, shock waves pass through the tissues and, without damaging them, break the stone into small fragments, which then gradually begin to be excreted with urine. All treatment methods complement each other, and individual treatment methods are selected for each patient, taking into account the specific localization of the stone, its size, volume, density, and the specific anatomy of the urinary system.

The choice of medical care method (observation, conservative treatment, surgical intervention) should be decided by qualified urologists equipped with modern equipment for the diagnosis and treatment of all types of urolithiasis.

Kidney stone disease is a chronic disease in which stones form in the renal pelvis due to impaired urine concentration and changes in the quantity and quality of

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urine. These changes are also associated with a violation of the general metabolism in the body.

Increased protein breakdown due to overeating (especially meat products) leads to a disruption of this metabolism in the body. That is, stones form from salts that accumulate in the renal pelvis and urinary tract due to the disease.

Causes of kidney stones. The causes of kidney stones are not fully understood. However, metabolic disorders in the body are one of the main causes. Also, disorders of the urinary system (urodynamics) caused by infectious inflammation of the kidneys and urinary tract can aggravate the disease.

Symptoms of Kidney Stones.

First of all, urine becomes bitter and painful, and urine becomes cloudy. As a result of the accumulation of stones in the urinary tract, an obstruction occurs, causing kidney pain. The pain can reach the level of an attack. The pain that occurs in the lower back, radiating to the bladder along the groin area, intensifies. During and after an attack, the urine becomes bloody. Symptoms such as nausea, vomiting, loss of appetite, sleep and other mental disorders can also be observed in the disease. Such patients should definitely consult a urologist and nephrologist. The disease is accurately diagnosed based on laboratory and special equipment examinations.

Treatment of the disease. The treatment of this disease mainly consists of coordinating metabolic disorders in the body, facilitating the movement of urine in the kidneys and urinary tract. It also fights urinary tract infections.

Research Results

1. Distribution of rocks by chemical composition

Stone Type Percentage	**(%)**
Calcium (oxalate, phosphate)	68%
Uric acid (urate)	14%
Infectious (struvite)	14%

2. Age distribution of patients

Age Group Percentage of Encounters	**(%)**
18–30 years	22%
31–50 years	48%
Over 51 years	30%

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Urolithiasis incidence by age (n=150)
(Diagram: The highest incidence rate is observed in the age group 31–50.)

2. Effectiveness of Treatment Methods

Treatment Type Effectiveness	(%)
Medication (with medication)	62%
Distance lithotripsy	87%
Endoscopic lithotripsy	90%
Surgery (nephrolithotomy)	95%

Minimally invasive techniques (lithotripsy) reduce the risk of complications by up to 40% compared to full surgery. Recurrence is not observed in 75% of patients.

Prevention of kidney stones. To prevent the occurrence and development of the disease, it is necessary, first of all, to monitor the metabolism in the body. This is achieved through adherence to a healthy lifestyle and a strict diet.

Effective ways to prevent kidney stones. Sudden, severe pain in the lower back or abdomen, and the need to urinate infrequently, often with pain - all these are the main symptoms of kidney stones.

Let's take a look at the foods that should be consumed and avoided to prevent kidney stones.

• Drink 3 liters of fluid per day. Drinking 3 liters of water per day is essential to prevent kidney stones. Clear or light yellow urine indicates adequate fluid intake. Drink 10-12 glasses of water per day (at least 6 glasses of water); This increases urine output, allowing chemicals to dissolve and be excreted in the urine before they can form into kidney stones.

• Balance your salt intake. When salt intake increases, the risk of kidney stones increases because the kidneys excrete more calcium in the urine. Therefore, it is important to pay attention to the consumption of products such as salty nuts, pickled products, pizza, hamburgers, mineral water and mineral water with a high sodium content.

Studies show that kidney stones are more common in children who eat frequently. The daily salt intake of people with a genetic predisposition to stone formation should not exceed 3-5 grams. (approximately one teaspoon). In daily nutrition; It is important to remember that vegetables, fruits and bread contain salt. Therefore, vegetable dishes should be prepared without adding additional salt.

• Avoid smoking. Smoking is one of the biggest enemies of the kidneys. It is important to note that smokers are at increased risk of chronic kidney disease.

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• Vitamin C supplements should not be used. Excessive intake of vitamin C may increase the excretion of oxalate in the kidneys (urine). Daily intake of vitamin C should not exceed 1000 mg.

•Reduce foods that promote stone formation. Calcium oxalate stones are one of the most common types of kidney stones. Oxalate is one of the most dangerous substances in terms of kidney stone formation. Therefore, foods rich in oxalate should be eliminated from the daily diet. Patients with kidney stones should avoid the following foods as much as possible;

Beverages: Tea, coffee, and alcoholic beverages. Vegetables: Spinach, chard, beets, okra, corn, green beans, potatoes, tomatoes, soybeans, horseradish, parsley, fennel.

Fruits: Figs, raspberries, red plums, strawberries, blueberries, currants

Pistachios: Walnuts, hazelnuts, almonds, peanuts

Other foods: Sesame, chocolate, cocoa, cinnamon, soy, ice cream

If you eat foods that contain oxalate, eat them with a calcium-rich product like yogurt/cheese. This helps the oxalate bind to calcium during digestion before it reaches the kidneys. It is important to support it with adequate fluids when consuming it.

• Eat foods high in fiber. Your daily diet should be varied. Avoid eating too much of one food. Eat foods high in fiber. Foods high in fiber, such as vegetables, fruits, and legumes, help prevent constipation. Foods high in fiber slow down the passage of nutrients through the intestines, thereby reducing oxalate absorption.

• Reduce animal protein. High-protein animal foods that contain calcium, such as meat, fish, chicken, and eggs, can lead to uric acid buildup in the body and the formation of kidney stones. Frequent consumption of these foods reduces citrate. Processed meats contain significant amounts of salt. These meats, which have been implicated in the formation of uric acid stones, should not be consumed regularly or in excess.

Protein intake can be met with more yogurt and legumes for a while instead of animal protein sources.

It is also recommended to stay away from carbonated drinks, which increase the acidity of urine and contribute to stone formation.

• Eat 1 cup of yogurt a day. Milk and yogurt, which are rich in calcium, should be consumed in a balanced manner. Women should consume one cup of yogurt or one

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glass of milk every day to reduce the risk of osteoporosis that can develop during menopause.

It is also important to get the right amount of vitamins D and C. Excess intake of these vitamins increases the risk of kidney stones.

• Increase your intake of citrus fruits. Citrus fruits help prevent and reduce the formation of stones. Don't forget to consume oranges and lemons and lemon juice when they are in season.

The citrate in lemons helps prevent kidney stones. Therefore, it is important to consume lemons and oranges, which contain citrate, which removes uric acid. Adding lemon to foods such as tea and soup, and drinking lemonade frequently can prevent kidney stones.

Conclusion

Urolithiasis is a common urological problem associated with metabolic disorders, accounting for 35% of urological hospitalizations.

• The most common type of stone is calcium oxalate (68%).

• The most effective treatment method is distance shock wave lithotripsy (87%).

• The risk of recurrence of the disease is reduced by 2.3 times in patients who adhere to a diet and fluid regimen.

• Through prophylaxis, it is possible to detect and prevent cases of urolithiasis at an early stage.

Recommendations

• Drink at least 2.5–3 liters of water per day.

• Limit salt, sugar, and animal protein.

• Reduce foods rich in oxalates (spinach, beets, chocolate, nuts).

• Get an ultrasound every 6 months.

• Avoid smoking and excessive consumption of vitamin C.

• Prioritize vegetables, fiber, and citrus fruits in your diet.

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