PATIENT INFORMATION

Kidney Stone Prevention

Physician Questions

In this document you will find: Important Questions to Ask Your Physician, Diagnosis and Treatment and a Glossary of Terms.

"Based upon my Litholink™ 24 Hour Urine report, what is my diagnosis?"

- ○ Low Fluid Volume
- ○ Hypercalciuria
- ○ Hyperoxaluria
- ○ Hyperuricosuria
- ○ Hypocitraturia
- ○ Low Urine pH

"What will my preventative treatment plan be?"

- ○ Increase Fluid Intake
- ○ Medication
- ○ Lower Oxalate Diet
- ○ Lower Sodium Diet
- ○ Lower Fat Diet
- ○ Lower Protein Diet
- ○ Normal Calcium Diet (800 - 1,200 mg/day)
- ○ Other _____

(see diagnosis and treatment section for explanation)

"Do I need to complete a follow-up test?"

○ Yes ○ No

If yes, record date here: _____

Although each patient is different, here are some basic guidelines to prevent future stones:

- Follow your physician's advice on any diet or lifestyle changes.
- Take your medications every day and in the amounts prescribed by your doctor (not taking medications will cause your urine chemistries to return to a stone-forming state within days).
- Follow-up urine chemistries indicate whether medications and diets are working. Always collect urine samples at your doctor's request.
- If you pass any stone material, be sure to give it to your doctor for analysis.
- Be sure to have periodic X-rays or ultrasounds to monitor the growth or formation of new stones, as your doctor recommends.

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Diagnosis and Treatment

Your physician will tell you why you are forming stones (diagnosis) and then start you on a treatment plan that best suits your specific medical case. Below you will find a description of each diagnosis and its possibletreatment options.

Low Urine Volume

(not producing enough urine)

Treatment:

Increase Fluid Intake
The most basic thing you can do to help in the prevention of future kidney stones is to increase your daily fluid intake. Water is best. You should be producing at least 2.5 liters of urine per 24- hour period. The more water you drink the easier it is for your body to dissolve the substances that make stones. The color of your urine is a good indicator in determining if you are drinking enough water. If your urine is a dark yellow, you need to be drinking more. If your urine is clear like water, you are on the right track!

Hypercalciuria

(large amounts of calcium in the urine)

Possible Treatments:

Thiazide Diuretics (e.g., chlorthalidone or hydrochlorothiazide)
These drugs help to decrease urine calcium excretion. They also help keep calcium in the bones where it belongs. The most common side effect from the thiazide diuretics is potassium loss. Many times a doctor will prescribe a potassium supplement to ensure your potassium levels remain within normal limits.

Lower Sodium Intake
It is important to lower your salt intake as this by itself helps to lower the amount of calcium being lost in your urine. More importantly, if you are on one of the medications listed above, the medication will not work as well if you do not limit your sodium intake.

Sodium blocks the effects of the thiazide medications. An ideal intake is between 2,300 and 3,300 mg of sodium daily. Also, the less sodium you eat, the fewer potassium supplements you will need to take if you are on a thiazide diuretic.

Normal Calcium Diet
Cutting calcium out of your diet can lead to an increase in your urine oxalate level. Calcium oxalate is the most common type of kidney stone. Normally, calcium and oxalate bind together in your intestine and are eliminated from the body. If there is no calcium to join with oxalate, the oxalate will be reabsorbed by your body and passed into the urine where it may increase your risk of kidney stones.

A normal calcium diet contains between 800 and 1,200 mg of calcium daily from foods and calcium fortified drinks. It is best to get the calcium from your diet. If you are unable to get sufficient calcium from the diet, then calcium supplements may need to be used. Generally it is best to take calcium supplements with meals. Food is always preferred over supplements, as your body more readily absorbs food.

Fluid Intake
No matter what your diagnosis, you should drink enough water to produce at least 2.5 liters of urine per 24-hour period.

Hypocitraturia

(low amount of citrate in the urine)

Possible Treatments:

Citrate Supplementation (e.g., potassium citrate or sodium bicarbonate)
Citrate is a molecule in blood and urine that binds to calcium. When citrate binds to calcium in the urine, it acts like a shield by preventing calcium from binding with oxalate or phosphate. This shield helps protect you from making more kidney stones. This treatment will provide you with a bigger shield.

If you have low or normal blood potassium levels, your doctor may prescribe a potassium citrate supplement. Because your body already contains potassium and citrate, this treatment is not considered a medication, but a supplement. Your individual dosage will vary depending upon how low your citrate level is. If your potassium citrate therapy is causing stomach upset try taking your pills with meals.

If you have high blood potassium levels, your doctor may prescribe a sodium salt such as Bicitra or sodium bicarbonate tablets to raise your citrate level.

Lower Protein Intake
Restrict your daily protein intake to 6 to 8 oz a day; do not binge on 16 or 24 oz servings of meat in one sitting. This includes beef, pork, chicken, fish and organ meats. If you are eating too much protein per day, this could lead to lower citrate levels in your urine, thus leaving you with an insufficient shield against new stone formation.

Increase Citrus Juice Intake
Your physician may tell you to add orange juice or diluted lemon juice into your diet. There are studies that indicate that these citrus juices may increase your urine citrate level and decrease your urine calcium.

Increase Fluid Intake
No matter what your diagnosis, you should drink enough water to produce at least 2.5 liters of urine per 24-hour period.

Hyperoxaluria

(high amount of oxalate in the urine)

Possible Treatments:

Lower Oxalate Intake

Unfortunately, oxalate is found in healthy plant foods. What can become confusing for some patients is that they have already been put on dietary restrictions because of other medical conditions (e.g., heart related problems, diabetes, blood pressure).

You may have been told by another physician to "eat a diet low in fat and sugar but rich in vegetables". What now? The key to diets is everything in moderation!

If you have been told to "watch your oxalate intake" then remember to cut back on the portion size of the high oxalate containing foods and the number of times a day or week you are eating these foods. Here and there you will indulge, and when you do, make sure you flush out the extra oxalate with an added 8 oz glass of water—before and after your treat!

Normal Calcium Intake

Oxalate and calcium bind together in your intestine and leave the body together. If you do not have sufficient calcium intake, then oxalate has no partner to join with and leave the body. Therefore, a low calcium diet may lead to an increase in your urine oxalate level. Make sure your diet contains 800-1,200 mg of calcium per day.

Increase Fluid Intake

No matter what your diagnosis, you should drink enough water to produce at least 2.5 liters of urine per 24-hour period.

Hyperuricosuria

(high amount of uric acid in the urine)

Possible Treatments:

Lower Protein Intake

Most people are able to reduce uric acid levels by diet alone. Avoid eating organ meats, (e.g., liver and brain). Reduce your daily intake of animal meats to 6 to 8 oz per day. This includes: beef, chicken, pork and fish.

Many patients have been told to watch beef consumption and have overcompensated by eating higher levels of chicken and seafood instead. Moderation is the key with all diets. Watch the portion size of each of the above foods and the amount of times you are eating them per day.

Allopurinol

If you have tried a low protein diet and your stones are still active, your physician may prescribe the drug allopurinol. This drug has been proven successful in lowering urine uric acid levels by blocking the conversion of purines to uric acid (high uric acid levels promote calcium oxalate stone formation). Allopurinol has been used in treating patients with gout, a painful metabolic disease that is caused by excessive uric acid buildup.

Maintain a Healthy Body Weight

Being overweight can help in contributing to uric acid buildup. Consult your doctor about starting a healthy weight loss program that includes diet modification and exercise.

Increase Fluid Intake

No matter what your diagnosis, you should drink enough water to produce at least 2.5 liters of urine per 24-hour period.

Low Urine pH

(acidic urine)

Possible Treatments:

Citrate Supplementation (e.g., potassium citrate or sodium bicarbonate)

If you have low or normal blood potassium levels, your doctor may prescribe a potassium citrate supplement. This treatment will help raise your urine pH. These supplements act like an antacid would in your stomach, making the environment, in this case urine, less acidic. They also help raise your urine citrate level.

If you have high blood potassium levels, your doctor may prescribe a sodium salt, such as Bicitra or sodium bicarbonate tablets, to raise both your urine citrate level.

Lower Protein Intake

If you are consuming more than 16 oz of beef, pork, chicken or fish daily, you run the risk of having a low urine pH.

If you reduce your protein intake by cutting back on the portion size of these products and the number of times you are eating these products each day/week, you may be able to raise your urine pH to a more basic level.

Increase Fluid Intake

No matter what your diagnosis, you should drink enough water to produce at least 2.5 liters of urine per 24-hour period.

Glossary of Terms

A

Acidic urine (a·cid·ic u·rine)
The lower the pH in your urine, the greater the acidity. May lead to an increased risk of forming uric acid stones.

Alkaline urine (al·ka·line·u·rine)
The higher the pH in your urine, the greater the alkalinity. May lead to an increased risk of forming calcium phosphate stones.

Allopurinol (al·lo·pu·ri·nol)
Medication used to lower blood uric acid levels.

Amiloride (amil·o·ride)
Amiloride is a potassium-sparing (prevents excess loss of potassium) diuretic drug. Diuretics increase urinary salt and water loss from the body and are used to treat high blood pressure, congestive heart failure, and some kidney or liver conditions.

B

Bladder infection (blad·der in·fec·tion)
Usually refers to a urinary tract infection. It is a bacterial infection that affects any part of the urinary tract.

C

Calcium citrate (cal·ci·um cit·rate)
The preferred type of calcium supplement for kidney stone formers. The extra citrate helps avoid any increase in calcium stone formation.

Calcium oxalate stones (cal·ci·um ox·a·late stone)
The most common form of kidney stone. Kidney stones formed by calcium and oxalate crystals. These stones usually develop in acidic urine.

Calcium phosphate stones (cal·ci·um phos·phate stone)
Kidney stones formed by calcium and phosphate crystals. These stones usually develop in alkaline urine.

Calculi (cal·cu·li)
The plural of calculus. Refers to many stones.

Captopril (cap·to·pril)
Medication used to protect kidney function in diabetic patients who have protein loss. Maybe used to treat patients with cystinuria.

Chlorthalidone (chlor·thal·i·done)
A diuretic used to increase the amount of urine passed which causes the body to lose water and salt. In kidney stone prevention this drug is used to lower urine calcium.

Cholestyramine (cho·le·styr·a·mine)
Used to remove substances called bile acids from your body so they cannot injure your colon. For people with malabsorption or intestinal issues.

Citrate (cit·rate)
An important urinary acid neutralizer and inhibitor of kidney stone formation.

Computerized tomography or Computer axial tomography (CT or CAT scan) (com·put·er·ized to·mog·ra·phy or com·put·erax·i·al to·mog·ra·phy)
A diagnostic imaging technique in which a computer creates a three-dimensional map of your body.

Crystal (crys·tal)
A rock formed by the solidification of a substance.

Cystinuria (cys·tin·uria)
The presence of cystine in urine. Abnormally high urinary levels of cystine in the urine. It is rare, genetic disease.

Cystoscopy (cys·tos·co·pee)
The act of examining the bladder with a scope.

D

Diuretic (di·u·ret·ic)
Proper name for a “water pill.” A medication that causes the kidney to excrete more salt and water in the urine. Often used to reduce swelling and bloating.

E

Extracorporeal shock wave lithotripsy (SWL)
(ex·tra·cor·po·re·al shock wave lith·o·trip·sy)
A machine used to send shock waves directly to a kidney stone to break a large stone into smaller stones that will pass through the urinary system.

G

Gross Hematuria (gross he·ma·tu·ri·a)
Severe presence of red blood cells in the urine. Gross Hematuria can be seen with the naked eye. The urine is red or the color of cola.

Gout (gout)
Gout is one of the most common forms of arthritis (joint inflammation) caused by uric acid build up. Excessive uric acid buildup can lead to an increased risk of kidney stone formation.

H

Hematuria (he·ma·tu·ri·a)
The presence of red blood cells (RBCs) in the urine.

Horseshoe kidney (horse·shoe kid·ney)
This occurs during fetal development. The kidneys of the fetus rise from the pelvic area, they fuse together at the lower end or base. By fusing, they form a "U" shape, which gives it the name "horseshoe."

Hydrochlorothiazide (hy·dro·chlo·ro·thi·a·zide)
A diuretic used to increase the amount of urine passed which causes the body to lose water and sodium excreted in the urine. In kidney stone prevention this drug is used to lower urine calcium.

Hydronephrosis (hy·dro·ne·phro·sis)
A condition that occurs as a result of urine accumulation in the upper urinary tract. This usually occurs from a blockage somewhere along the urinary tract.

Hypercalciuria (hy·per·cal·ciuria)
Large amounts of calcium in the urine.

Hypocitraturia (hy·po·cit·ra·tu·ria)
Low amounts of citrate in the urine.

Hyperoxaluria (hy·per·ox·a·lu·ria)
Large amounts of oxalate in the urine.

Hyperuricosuria (hy·per·ur·i·co·su·ria)
Large amounts of uric acid in the urine.

I

Idiopathic (id·i·o·path·ic)
Relating to a condition having no known cause.

Intravenous pyelogram (IVP) (in·tra·ve·nous py·e·lo·gram)
A series of x-rays of the kidney, ureters, and bladder with the injection of a contrast dye into the vein, used to detect tumors, anatomic abnormalities, kidney stones, or any obstructions.

K

Kidney (kid·ney)
The kidneys filter wastes from the blood to form urine. They also regulate amounts of certain vital substances in the body.

M

Magnesium Ammonium Phosphate Stones (mag·ne·si·um am·mo·ni·um phos·phate stone)
These are also called struvite or infection stones. They form in alkaline urine and are associated with urinary tract infections.

Magnesium oxide (mag·ne·si·um ox·ide)
Magnesium oxide is used as a dietary supplement when the amount of magnesium in the diet is not enough.

Metabolic testing (met·a·bol·ic testing)
A comprehensive evaluation of kidney stone risks using blood and urine chemistries.

N

Nephrectomy (ne·phrec·to·my)
Surgery to remove the kidney(s).

Nephritis (ne·phri·tis)
Inflammation of the kidneys.

Nephrolithiasis (neph·ro·li·thi·a·sis)
Calculi in the kidneys.

Nephrologist (ne·phrol·o·gist)
This doctor is first trained in internal medicine and then will specialize in kidney disease. You may be sent to a nephrologist if you have chronic stone disease. This doctor does not perform surgeries.

O

Oxalate (ox·a·late)
An acid found in many plants and vegetables. The body also produces oxalate. It is a chemical compound that is found in most calcium kidney stones.

P

Polycystic kidney disease (pol·y·cys·tic kid·ney dis·ease)
Polycystic kidney disease (PKD) is a genetic disorder characterized by the growth of numerous cysts in the kidneys. The cysts are filled with fluid. PKD cysts can slowly replace much of the mass of the kidneys, reducing kidney function and leading to kidney failure. Associated with increase risk of kidney stones.

Proteinuria (pro·tein·u·ri·a)
Large amounts of protein in the urine.

Purine (pu·rine)
A metabolic precursor of uric acid that can lead to increase risk of kidney stones.

Pyridoxine (pyr·i·dox·ine)
A vitamin B6 supplement that may be used to lower oxalate levels in patients with genetic hyperoxaluria.

Penicillamine (pen·i·cil·la·mine)
Medication used to treat patients with excessive amounts of the amino acid cystine in the urine or who have a history of recurrent cystine kidney stones.

Percutaneous nephrostomy (per·cu·ta·ne·ous ne·phros·to·my)
A procedure used to drain urine from a kidney that is obstructed. A tube is placed through the skin on the back into the kidney to divert urine to the outside of the body.

Potassium citrate
Potassium supplement that increases urine citrate and pH.

R

Renal tubular acidosis (re·nal tu·bu·lar ac·i·do·sis) (RTA)
A disease that occurs when the kidneys fail to excrete acids into the urine, which causes a person's blood to remain too acidic, the urine becomes alkaline and calcium phosphate stones form.

Renal ultrasound (re·nal ul·tra·sound)
The test is used to determine the size and shape of the kidney, and to detect a mass, kidney stone, cyst, or other obstruction or abnormalities.

S

Sodium (so·di·um)
One of the components of table salt. A mineral needed by the body to keep body fluids in balance. Sodium is found in table salt and in many processed foods. Excessive salt or sodium in the diet can increase urinary calcium excretion and block the effects of some corrective medication. A mineral needed by the body to keep body fluids in balance. Sodium is found in table salt and in many processed foods. Too much sodium can cause the body to retain water.

Staghorn (stag·horn)
Refers to the branched shape of certain large stones. Usually associated with struvite or infection stones, the actual stone material can be almost any chemical stone ingredient.

Stent (stent)
A thin, slender tube designed to bypass any obstruction of the ureter such as from a stone or scar tissue. One end of the stent is placed in the kidney, and the other is in the bladder. Each end of the stent usually forms a small circle to help keep it in place.

Struvite (stru·vite)
Another name for magnesium ammonium phosphate or infection stones.

Supersaturation (su·per·sat·u·ration)
A measure of how overloaded the urine is with stoneforming material.

T

Thiazide (thi·a·zide)
A diuretic used to increase the amount of urine passed which causes the body to lose water and sodium excreted in the urine. In kidney stone prevention this drug is used to lower urine calcium.

U

Ureteroscopy (ure·ter·os·co·py)
The act of examining the ureter with a scope, often to find and treat kidney stones.

Uric acid (u·ric ac·id)
Uric acid is a product of the metabolism (breakdown) of purines.

Uric acid stones (u·ric ac·id stones)
Kidney stones made of pure uric acid crystals. These stones develop in acidic urine and are radiolucent, that is, they don't show up on plain x-rays of the abdomen.

Urinary tract infection (UTI) (u·ri·nar·y tract in·fec·tion)
Usually refers to a bladder infection.

Urine pH (u·rine pH)
A test that measures the pH (acidity) of urine.

Urologist (u·rol·o·gist)
The urologist is a surgeon that specializes in diseases of the urinary tract.

Ureteral Stone (u·re·teral stone)
A calculus usually originating in the kidney that moves into the ureter.

Ureters (u·re·ters)
Two narrow tubes that carry urine from the kidneys to the bladder.

Our hours of operation are

Monday – Friday, 07:00 a.m. – 07:00 p.m. CT.

You may also visit our website at
www.litholink.labcorp.com
and send any email inquiries to
Litholinkinquiry@labcorp.com

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