

Guide to Kidney Stones and How to Prevent Them

Pat Fulgham, MD

Question: Why do stones develop?

Different kinds of stones form in different people for different reasons. Some diseases like high blood pressure, diabetes, obesity, osteoporosis, or chronic diarrhea might increase the risk. Heredity also plays a role in the formation of some kinds of stones. Certain metabolic imbalances in your system, like too much (or too little) calcium or oxalate, a common component of foods, might be involved. Some medications and supplements, like guaifenesin (for coughs) and topiramate (for epilepsy or migraines), also increase the risk of stone formation. But other important risk factors are directly related to diet and lifestyle. Obesity is a major risk factor. Dehydration that results from not drinking enough fluids is strongly linked to kidney stones, as are excessive salt intake and consuming too much animal protein (meat, poultry, and fish). For stones to form, a person's urine needs to be supersaturated with stone-forming compounds. This means there are not enough fluids in your urine to dissolve the solid particles that can form stones. These compounds are also more likely to form crystals when the urine has low levels of substances called inhibitors. Inhibitors slow the formation and growth of stones. Citrate is one of the most important inhibitors.

Question: Who gets stones?

A lot of people, even as far back as a 7,000-year-old Egyptian mummy discovered by scientists, have evidence of kidney stones! Every year, more than half a million people seek emergency treatment for kidney stone problems. Worldwide, 1 in 10 people might expect to have a kidney stone in their lifetimes. And over the past 30 years, they've become even more common, growing from less than 4% to more than 5% of the US population. If a person gets a stone, he or she has a 30% to 50% chance of getting another stone within 5 years. The average rate of new stone formation in those who develop recurrent stones is 1 every 2 or 3 years. Although it was previously thought that men were 3 times more likely to form stones than women, recent evidence suggests that women are forming stones at an increased rate, and currently the male to female ratio of stone formation is only 1.3 to 1.4.

Question: How are stones treated?

There is no cure for kidney stones, but once the immediate pain of the passing stone or stone removal has been resolved, the key to therapy is simple: prevent recurrence. Fortunately, the most common types of stones (calcium and uric acid) can be effectively managed with a combination of medication and diet/lifestyle changes. Medicine includes thiazide diuretics, potassium citrate, and allopurinol in appropriate patients.

Question: How can I avoid getting more stones?

Unless your stones are linked to a specific disease, the lifestyle and diet choices you make have a major impact on your likelihood of developing more stones. An overall strategy includes reaching and maintaining a healthy weight, and optimizing your diet. For most patients with stones, especially those due to calcium oxalate, dietary recommendations are neither complicated nor bland. The tables that follow provide a quick overview of dietary guidelines for preventing the recurrence of kidney stones.

References:

The information provided on this page came from The ABCs of Kidney Stones, a Patient's Guide to Help Prevent Recurrent Kidney Stones. This guide may be accessed online at <http://www.stonedisease.org>

The tables that follow are from the Kidney Stones Handbook: A Patient's Guide to Hope, Cure and Prevention. 2nd Edition. Gail Savitz, Stephen W. Leslie, M.D. August 2000. (Currently out of print)

Food Sources of Oxalates: Calcium-Oxalate Stones

Foods to avoid or limit

<i>Fruits</i>	<i>Vegetables</i>		<i>Nuts</i>	<i>Beverages</i>	<i>Other</i>
Berries, all	Baked beans	Leeks	Almonds	Chocolate	Grits
Currants	Beans, green & wax	Mustard greens	Cashews	Cocoa	Tofu
Concord grapes	Beets	Okra	Peanuts	Draft beer	Soy products
Figs	Beet greens	Peppers, green	Peanut butter	Tea	Wheat germ
Fruit cocktail	Celery	Rutabagas			
Plums	Chard, swiss	Spinach			
Rhubarb	Chives	Summer squash			
Tangerines	Collards	Sweet potatoes			
	Eggplant	Tomatoes			
	Endive	Tomato soup			
	Kale	Vegetable soup			

Low-Calcium Diet: Calcium Stones

(approximately 400 mg calcium per day)

<i>Food Group</i>	<i>Foods Allowed</i>	<i>Foods Not Allowed</i>
<i>Beverage</i>	Carbonated beverage, coffee, tea	Chocolate-flavored milk, milk drinks
<i>Cereals</i>	Refined cereals	Oatmeal, whole-grain cereals
<i>Fat</i>	Butter, cream 2 tbsp daily; french dressing, margarine, salad oil, shortening	Cream (except in amount allowed), mayonnaise
<i>Fruits</i>	Canned, cooked or fresh fruits or juice except rhubarb	Dried fruit, rhubarb
<i>Meats, eggs</i>	8 oz daily of any meat except those not allowed	Clams, oysters, shrimp, cheese
<i>Starch</i>	Potato, hominy, macaroni, noodles, refined rice, spaghetti	Whole-grain rice
<i>Soups</i>	Broth, vegetable soup	Bean or pea soup, cream or milk soup
<i>Vegetables</i>	Any canned, cooked or fresh or juice except those not allowed	Dried beans, broccoli, green cabbage, celery, chard, collards, endive, greens, lettuce, lentils, okra, parsley, parsnips, dried peas, rutabagas
<i>Other</i>	Herbs, pickles, popcorn, relishes, salt, spices, vinegar	Chocolate, cocoa, milk gravy, nuts, olives, white sauce

Acid Ash Diet: Calcium Stones

Total acid ash should be greater than the total alkaline ash each day.

<i>Food Group</i>	<i>Unrestricted Foods Eat as much as desired</i>	<i>Restricted Foods Do not eat more than the amount allowed each day</i>	<i>Foods Not Allowed</i>
Beverages		2 cups daily of milk; cream 1/3 cup or less daily	Carbonated beverages such as ginger ale, cola, root beer
Bread	Any, preferably whole grain, crackers, rolls		
Cereals	Any, preferably whole grain		
Desserts	Angel food or sunshine cake, cookies made without baking powder or soda; cornstarch pudding; cranberry desserts, custards, gelatin, ice cream, sherbet, plum or prune desserts, rice or tapioca pudding		Chocolate or syrups other than those under "unrestricted foods"
Fats	Any, as butter, margarine, salad dressings, shortening, lard, salad oils, olive oil		
Fruits	cranberries, plums, prunes	One serving of fruit daily (in addition to the unrestricted fruits)	
Meat, eggs, cheese	Any meat, fish, fowl 2 servings daily; at least one egg daily		
Vegetables		Two servings daily (including potato)	Dried beans, beet greens, dandelion greens, carrots, chard, lima beans
Starch	Corn, hominy, lentils, macaroni, noodles, rice, spaghetti, vermicelli		
Soup	Broth as desired, other soups from foods allowed		
Other	Cream sauce, gravy, peanut butter, peanuts, popcorn, salt, spices, vinegar, walnuts		

Low-Purine Foods: Uric Acid Stones

<i>Food Group</i>	<i>Unrestricted Foods Use as desired</i>	<i>Foods Moderate in Purine (No more than 1 item 4x a week)</i>	<i>Foods Containing large amount of purine (No more than 1 x a week)</i>	<i>Avoid entirely</i>
<i>Beverages</i>	Carbonated, chocolate, cocoa, coffee, fruit juice, postum, tea			
<i>Bread</i>	White and crackers, cornbread			
<i>Cereal</i>	Corn, rice, tapioca, refined wheat, macaroni, noodles	Oatmeal		
<i>Cheese</i>	All kinds			
<i>Other</i>	Butter, eggs, fats of all kinds in moderation	Bouillon	Chicken soup, meat soup	
<i>Fruits</i>	All			
<i>Desserts</i>	Gelatin, pies (except mincemeat), sugar and sweets			
<i>Vegetables</i>	Artichokes, beets, beet greens, broccoli, brussels sprouts, cabbage, carrots, celery, corn, cucumber, eggplant, endive, kohlrabi, lettuce, okra, parsnips, potato, pumpkin, rutabagas, sauerkraut, string beans, summer squash, swiss chard, tomato, turnips	Asparagus, cauliflower, kidney beans, lima beans, mushrooms, navy beans, peas, spinach	Lentils	
<i>Meat</i>		Bluefish, chicken, crab, finnan haddie, ham, herring, lobster, mutton, oysters, salmon, shad, tripe, tuna fish, whitefish	Bacon, beef, calf tongue, carp, codfish, duck, goose, halibut, liver sausage, partridge, perch, pheasant, pigeon, pike, pork, quail, rabbit, sheep, shellfish, squab, trout, turkey, veal, venison	Sweetbreads, anchovies, sardines in oil, liver (calf, beef), kidneys (beef), brains, meat extracts, gravies