

Kidney Stone Diet

Purpose

Almost everyone knows someone who has had kidney stones. The kidneys filter the blood to remove excess mineral salts and other soluble (dissolvable) wastes. The kidneys also produce the urine that dissolves these wastes and excretes them through the urinary tract. Kidney stones form when the urine becomes so saturated with a certain mineral that no more of it can dissolve into the urine (like trying to dissolve too much sugar in your iced tea). The undissolved portion of the mineral forms crystals that then clump together and grow into hard stones. Kidney stones usually develop in the kidneys. However they can form anywhere in the urinary tract. This condition is medically known as urolithiasis or nephrolithiasis.

When kidney stones are quite tiny, they may pass unnoticed with the urine. Often however, they grow too large to pass easily through the urinary tract, and some stones have rough or sharp edges. When these stones are passing through the urinary tract, it can be quite painful. In some cases, kidney stones cannot pass on their own, and treatment with specialized medical equipment or surgery may be necessary.

For most people, kidney stones are like dandelions in the lawn; they can be eliminated, but they'll be back another year. Therefore, a major part of the treatment for this condition is aimed at preventing recurrences. There are various types of kidney stones. Because treatment for each differs, it is important for the physician to determine the stone's mineral content and to identify any medical conditions that may have contributed to stone formation. Preventive treatment may be with medications and/or changes in the diet.

About 80% of all kidney stones are composed of calcium and other minerals, usually a combination of calcium and oxalate. In some cases dietary adjustments help to prevent the recurrence of these types of stones.

Nutrition Facts

Diets for managing calcium kidney stones have adequate nutrients for most healthy adults. However, the Recommended Dietary Allowance (RDA) for calcium may not be met in post-menopausal, pregnant, or breast-feeding women; or in people under 25

years of age. Calcium supplements are generally not recommended, unless approved by a physician.

Special Considerations

1. Increase fluid intake. This is the most important preventive measure for all patients who develop kidney stones. It hinders the formation of stones by diluting the urine. For example, more sugar can be dissolved in a full glass of iced tea than in a half glass. Patients should drink enough fluid to produce two quarts or more of urine each day. As a guideline, drink 8-10 oz of fluid every hour while awake, and 8-10 oz once during the night if awakened for some reason. At least 50% of the total fluid intake should be water. In warmer climates and for physically active people, an even higher fluid intake is recommended.

2. Calcium: Calcium from food sources is absorbed during digestion in the intestines. The body uses this mineral for many important functions. Any excess that has been absorbed is excreted or passed through the kidneys. The biggest portion of calcium in the diet comes from milk and foods made from large amounts of milk, such as cheeses and yogurt. The calcium in these foods is usually easily absorbed. Other foods, such as dark green leafy vegetables, contain significant amounts of calcium. However, they also contain other substances which prevent the body from readily absorbing the calcium. So, the amount of available calcium in green leafy vegetables is less than in milk. Certain antacids and over-the-counter medications also contain calcium that may or may not be in a form the body can absorb.

Usually the body does not absorb more calcium than is needed. However, certain conditions can cause too much calcium to be absorbed, or too much to be passed into the kidneys. Too much calcium in the urine is medically known as hypercalciuria. Only in certain cases of hypercalciuria may calcium stones be prevented controlling the amount of calcium in the diet.

Food Sources of Calcium			
Gruyere Cheese, 1 oz.	287	Instant Oatmeal, 3/4 cup	163
Mozzarella Cheese, 1 oz	207	2% Cottage Cheese, 1 cup	155
Cheddar Cheese, 1 oz.	204	Broccoli, 1 stalk	150
Yogurt, 1/2 cup	200	Pizza, 1 slice	150
Macaroni & Cheese, 1/2 cup	200	Milk, 1/2 cup	150

7 ² Homemade Waffle, 1	179	Buttermilk, 1/2 cup	150
Vanilla Ice Cream, 1 cup	176	Baked Custard, 1/2 cup	149
Ice Milk, 1 cup	176	Pudding, 1/2 cup	146
American Cheese, 1 oz	174	Blackstrap Molasses, 1 T	137
Ricotta Cheese, 1/4 cup	167	Instant Nonfat Dry Milk, 2 T	105

If the physician has recommended a calcium controlled diet, the idea is to keep calcium intake within a narrow range, not too much and not too little, because the body needs a certain amount for maintaining important functions. On this diet, men are advised to limit calcium intake to 800 mg per day. Prior to menopause, women should limit calcium to 1000 mg per day; and after menopause, these women should have 1200 mg of calcium a day.

Patients on a calcium-controlled diet should consult the physician before taking any over-the-counter medication or vitamin supplement. For examples of foods containing calcium that is easily absorbed, see the table Food Sources of Calcium.

3. Oxalic acid or oxalate is found mostly in foods from plants. Calcium combines with oxalate in the intestines. This reduces calcium's ability to be absorbed. Sometimes oxalate or calcium oxalate stones form because there is not enough calcium in the intestines. Then, too much oxalate goes to the kidneys to be excreted. The medical term for too much oxalate in the urine is hyperoxaluria. In certain cases of oxalate or calcium oxalate stones, the physician may recommend reducing oxalate intake along with a slight increase in calcium. It is recommended that these patients have no more than 50 mg of oxalate per day in the diet. To do this, foods with high or moderate amounts of oxalate should be reduced or eliminated from the diet.

Although there are many foods that contain large amounts of oxalate, eight foods have been shown to be most at fault for raising urine oxalate levels. They are rhubarb, spinach, strawberries, chocolate, wheat bran, nuts, beets, and tea. For more information about the oxalate content of foods, see the table, Foods High in Oxalate on page 6.

4. Sugar, sodium, and animal protein: It has been found that too much of these may also aggravate the development of calcium or calcium oxalate stones. Some sugars occur naturally in foods and that is not a concern. However, people who get kidney

stones may benefit from avoiding packaged foods with large amounts of added sugars, and from reducing sugars added in food preparation and at the table.

Reducing sodium in the diet appears to reduce the amount of calcium excreted in the urine. Consequently, people who develop stones containing calcium may benefit from keeping sodium intake between 2300 to 3500 mg a day.

A diet high in animal protein affects certain minerals in the urine that may promote the formation of kidney stones. Therefore, people who tend to develop kidney stones should avoid eating more protein than the body needs each day. The physician or registered dietitian can recommend a daily protein intake for individual patients.

5. Insoluble fiber: Fiber is the indigestible part of plants. There are two types of fiber: soluble (dissolves in water) and insoluble. Both provide important functions in the body, but it is insoluble fiber (found in wheat, rye, barley, and rice) that may help to reduce calcium in the urine. It combines with calcium in the intestines, so the calcium is excreted with the stool instead of through the kidneys. Insoluble fiber also speeds up movement of substances through the intestine, so there will be less time for calcium to be absorbed.

6. Vitamin C: When vitamin C is used by the body, oxalate is produced. Therefore, if the physician has recommended reducing oxalate in the diet, taking vitamin C supplements may not be a good idea. It should be discussed with the physician.

Foods High in Oxalate (More than 10 mg per 1/2 cup serving)	
Beans string, wax Legume types (including baked beans canned in tomato sauce) Beets Blackberries Carob powder Celery Chocolate/cocoa other chocolate drink mixes Dark leafy greens Spinach Swiss chard	Gooseberries Grits (white corn) Instant coffee (more than 8 oz/d) Leeks Nuts, nut butter Okra Peel: lemon, lime, orange Raspberries (black) Red currants Rhubarb Soy products (tofu) Spinach Strawberries

Valley Gastroenterology

Beet greens Endive, escarole Parsley Draft beer Fruit cake Eggplant	Summer squash Sweet potatoes Tea Wheat bran Wheat germ
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Sample Menu For Kidney Stones Calcium or Calcium Oxalate Stones		
Breakfast	Lunch	Dinner
Grapefruit juice 1 cup cereal 3/4 cup skim milk 1 cup scrambled eggs 1 white toast 2 slices margarine 2 tsp coffee 1 cup water 1 cup	white meat chicken 2 oz wheat bread 2 slices ocheberg lettuce 1 cup oil/vinegar dressing 1 Tbsp canta loupe 1 cup lemonade 1 cup sugar cookie 1 water 1 cup	baked haddock 3 oz white rice 1/2 cup peas 1/2 cup margarine 2 tsp dinner roll 1 apple 1 animal crackers 16 water 1 cup

This Sample Diet Provides the Following			
Calories	1805	Fat	51 gm
Protein	81 gm	Sodium	1821 mg
Carbohydrates	261 gm	Calcium	692 gm