Questions & Answers about . . .

Gout

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
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You can also find this booklet on the NIAMS Web site at www.niams.nih.gov/hi/topics/gout/gout.htm.

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Information Box

This booklet contains general information about gout. It describes what gout is and how it develops. It also explains how gout is diagnosed and treated. If you have further questions after reading this booklet, you may wish to discuss them with your doctor.

What Is Gout?

Gout is one of the most painful rheumatic diseases. It results from deposits of needle-like crystals of uric acid in connective tissue, in the joint space between two bones, or in both. These deposits lead to inflammatory arthritis, which causes swelling, redness, heat, pain, and stiffness in the joints. The term *arthritis* refers to more than 100 different rheumatic diseases that affect the joints, muscles, and bones, as well as other tissues and structures. Gout accounts for approximately 5 percent of all cases of arthritis.

Pseudogout is sometimes confused with gout because it produces similar symptoms of inflammation. However, in this condition, also called chondrocalcinosis, deposits are made up of calcium phosphate crystals, not uric acid. Therefore, pseudogout is treated somewhat differently and is not reviewed in this booklet.

Uric acid is a substance that results from the breakdown of purines, which are part of all human tissue and are found in many foods. Normally, uric acid is dissolved in the blood and passed through the kidneys into the urine, where it is eliminated. If the body increases its production of uric acid or if the kidneys do not eliminate enough uric acid from the

body, levels of it build up in the blood (a condition called hyperuricemia). Hyperuricemia also may result when a person eats too many high-purine foods, such as liver, dried beans and peas, anchovies, and gravies. Hyperuricemia is not a disease and by itself is not dangerous. However, if excess uric acid crystals form as a result of hyperuricemia, gout can develop. The excess crystals build up in the joint spaces, causing inflammation. Deposits of uric acid, called tophi (singular: tophus), can appear as lumps under the skin around the joints and at the rim of the ear. In addition, uric acid crystals can collect in the kidneys and cause kidney stones.

For many people, gout initially affects the joints in the big toe. Sometime during the course of the disease, gout will affect the big toe in about 75 percent of patients. It also can affect the instep, ankles, heels, knees, wrists, fingers, and elbows. The disease can progress through four stages:

- **Asymptomatic (without symptoms) hyperuricemia**—In this stage, a person has elevated levels of uric acid in the blood but no other symptoms. A person in this stage does not usually require treatment.

- **Acute gout, or acute gouty arthritis**—In this stage, hyperuricemia has caused the deposit of uric acid crystals in joint spaces. This leads to a sudden onset of intense pain and swelling in the joints, which also may be warm and very tender. An acute attack commonly occurs at night and can be triggered by stressful events, alcohol or drugs, or the presence of another illness. Early attacks usually subside within

3 to 10 days, even without treatment, and the next attack may not occur for months or even years. Over time, however, attacks can last longer and occur more frequently.

- **Interval or intercritical gout**—This is the period between acute attacks. In this stage, a person does not have any symptoms and has normal joint function.

- **Chronic tophaceous gout**—This is the most disabling stage of gout and usually develops over a long period, such as 10 years. In this stage, the disease has caused permanent damage to the affected joints and sometimes to the kidneys. With proper treatment, most people with gout do not progress to this advanced stage.

What Causes Gout?

A number of risk factors are related to the development of hyperuricemia and gout:

- Genetics may play a role in determining a person's risk since up to 18 percent of people with gout have a family history of the disease.

- Gender and age are related to the risk of developing gout; it is more common in men than in women and more common in adults than in children.

- Being overweight increases the risk of developing hyperuricemia and gout because there is more tissue available for turnover or breakdown, which leads to excess uric acid production.

- Drinking too much alcohol can lead to hyperuricemia because it interferes with the removal of uric acid from the body.

- Eating too many foods rich in purines can cause or aggravate gout in some people.

- An enzyme defect that interferes with the way the body breaks down purines causes gout in a small number of people, many of whom have a family history of gout.

- Exposure to lead in the environment can cause gout.

Some people who take certain medicines or have certain conditions are at risk for having high levels of uric acid in their body fluids. For example, the following types of medicines can lead to hyperuricemia because they reduce the body's ability to remove uric acid:

- Diuretics, which are taken to eliminate excess fluid from the body in conditions like hypertension, edema, and heart disease, and which decrease the amount of uric acid passed in the urine;

- Salicylates, or anti-inflammatory medicines made from salicylic acid, such as aspirin;

- The vitamin niacin, also called nicotinic acid;
- Cyclosporine, a medicine used to suppress the body's immune system (the system that protects the body from infection and disease) and control the body's rejection of transplanted organs; and
- Levodopa, a medicine used to support communication along nerve pathways in the treatment of Parkinson's disease.

Who Is Likely To Develop Gout?

Gout occurs in approximately 840 out of every 100,000 people. It is rare in children and young adults. Adult men, particularly those between the ages of 40 and 50, are more likely to develop gout than women, who rarely develop the disorder before menopause. People who have had an organ transplant are more susceptible to gout.

How Is Gout Diagnosed?

Gout may be difficult for doctors to diagnose because the symptoms may be vague, and they often mimic other conditions. Although most people with gout have hyperuricemia at some time during the course of their disease, it may not be present during an acute attack. In addition, having hyperuricemia alone does not mean that a person will get gout. In fact, most people with hyperuricemia do not develop the disease.

Signs and Symptoms of Gout

- Hyperuricemia
- Presence of uric acid crystals in joint fluid
- More than one attack of acute arthritis
- Arthritis that develops in 1 day, producing a swollen, red, and warm joint
- Attack of arthritis in only one joint, usually the toe, ankle, or knee

To confirm a diagnosis of gout, a doctor may insert a needle into an inflamed joint and draw a sample of synovial fluid, the substance that lubricates a joint. A laboratory technician places some of the fluid on a slide and looks for monosodium urate crystals under a microscope. Their absence, however, does not completely rule out the diagnosis. Chalky, sodium urate deposits (tophi) around joints also may indicate the presence of gout. Gout attacks may mimic joint infections, and a doctor who suspects a joint infection (rather than gout) may check for the presence of bacteria.

How Is Gout Treated?

With proper treatment, most people with gout are able to control their symptoms and live productive lives. Gout can be treated with one or a combination of therapies. The goals of treatment are to ease the pain associated with acute

attacks, to prevent future attacks, and to avoid the formation of tophi and kidney stones. Successful treatment can reduce both the discomfort caused by the symptoms of gout and long-term damage to the affected joints. Treatment will help prevent disability due to gout.

The most common treatments for an acute attack of gout are high doses of nonsteroidal anti-inflammatory drugs (NSAIDs) taken orally (by mouth) or corticosteroids, which are taken orally or injected into the affected joint. NSAIDs reduce the inflammation caused by deposits of uric acid crystals but have no effect on the amount of uric acid in the body. The NSAIDs most commonly prescribed for gout are indomethacin (Indocin*) and naproxen (Anaprox, Naprosyn), which are taken orally every day. Corticosteroids are strong anti-inflammatory hormones. The most commonly prescribed corticosteroid is prednisone. Patients often begin to improve within a few hours of treatment with a corticosteroid, and the attack usually goes away completely within a week or so.

When NSAIDs or corticosteroids do not control symptoms, the doctor may consider using colchicine. This drug is most effective when taken within the first 12 hours of an acute attack. Doctors may ask patients to take oral colchicine as often as every hour until joint symptoms begin to improve or side effects such as nausea, vomiting, abdominal cramps, or diarrhea make it uncomfortable to continue the drug.

* Brand names included in this booklet are provided as examples only, and their inclusion does not mean that these products are endorsed by the National Institutes of Health or any other Government agency. Also, if a particular brand name is not mentioned, this does not mean or imply that the product is unsatisfactory.

For some patients, the doctor may prescribe either NSAIDs or oral colchicine in small daily doses to prevent future attacks. The doctor also may consider prescribing medicine such as allopurinol (Zyloprim) or probenecid (Benemid) to treat hyperuricemia and reduce the frequency of sudden attacks and the development of tophi.

What Can People With Gout Do To Stay Healthy?

- To help prevent future attacks, take the medicines your doctor prescribes. Carefully follow instructions about how much medicine to take and when to take it. Acute gout is best treated when symptoms first occur.

- Tell your doctor about all the medicines and vitamins you take. He or she can tell you if any of them increase your risk of hyperuricemia.

- Plan followup visits with your doctor to evaluate your progress.

- Maintain a healthy, balanced diet; avoid foods that are high in purines; and drink plenty of fluids, especially water. Fluids help remove uric acid from the body.

- Exercise regularly and maintain a healthy body weight. Lose weight if you are overweight, but do not go on diets designed for quick or extreme loss of weight because they increase uric acid levels in the blood.

What Research Is Being Conducted To Help People With Gout?

Scientists are studying which NSAIDs are the most effective gout treatments, and they are analyzing new compounds to develop safe, effective medicines to lower the level of uric acid in the blood and to treat symptoms. They also are studying the structure of the enzymes that break down purines in the body to achieve a better understanding of the enzyme defects that can cause gout.

Scientists are studying the effect of crystal deposits on cartilage cells for clues to treatment. They also are looking at the role of calcium deposits in pseudogout in the hope of developing new treatments. The role genetics and environmental factors play in hyperuricemia also is being investigated.

Where Can People Find More Information About Gout?

- **National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)**
  National Institutes of Health
  1 AMS Circle
  Bethesda, MD 20892–3675
  Phone: 301–495–4484 or
  877–22–NIAMS (226–4267) (free of charge)
  TTY: 301–565–2966
  Fax: 301–718–6366
  E-mail: NIAMSInfo@mail.nih.gov
  www.niams.nih.gov

NIAMS provides information about various forms of arthritis and rheumatic diseases and bone, muscle, joint, and skin diseases. It distributes patient and professional education materials and also refers people to other sources of information. Additional information and updates can be found on the NIAMS Web site.

- **American College of Rheumatology/Association of Rheumatology Health Professionals**
  1800 Century Place, Suite 250
  Atlanta, GA 30345–4300
  Phone: 404–633–3777
  Fax: 404–633–1870
  www.rheumatology.org

  This association provides referrals to rheumatologists. The organization also provides educational materials and guidelines about many different rheumatic diseases.

- **Arthritis Foundation**
  1330 West Peachtree Street
  Atlanta, GA 30309
  Phone: 404–872–7100 or 800–283–7800 (free of charge) or call your local chapter (listed in the phone directory)
  www.arthritis.org

  This is the main voluntary organization devoted to arthritis. The foundation publishes free pamphlets on many types of arthritis and a monthly magazine for members that provides up-to-date information on arthritis. The foundation also provides clinic referrals.

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