

Warfarin (Coumadin®)

Warfarin (Coumadin®) is prescribed fairly commonly to prevent blood clots. It is used after someone has formed a blood clot in a vein or when someone has a clotting disorder. It is also used in patients with heart problems such as atrial fibrillation (where the heart beats in an abnormal and fast rhythm) and in people who have artificial (mechanical) heart valves.

Warfarin is an anticoagulant. Anti means *against* and coagulant refers to *blood clots*. Therefore an anticoagulant helps to prevent clots from forming. These medications have been referred to as “blood thinners”; however they do not actually cause the blood to become less thick, only less likely to clot.

Warfarin works by inhibiting blood clotting factors. When blood forms a clot it does so by a complex process involving multiple clotting factors that act in sequence. These factors are produced in the liver. The liver uses vitamin K to produce these factors. Warfarin blocks the availability of vitamin K and thus limits the amount of clotting factors produced in the liver. The goal of therapy with warfarin is to decrease blood clot formation but not to prevent clotting completely.

History

Warfarin was first developed in 1948 through research and development of rodent (rat) poisons. Since warfarin is tasteless and odorless, it was effective when mixed with food to bait rodents. Rodents would return to the bait and continue to feed until lethal doses of the drug was consumed. The use of warfarin in rat poison is now declining because many rat populations have developed resistance to it and much better poisons are now available.

Warfarin was approved for medical use in humans in 1954. By then, vitamin K had been discovered to be a specific antidote.

How to take the medication

Because taking the correct dose of this medication is critical for it to work, the following rules for taking warfarin should be followed.

- Warfarin should be taken once daily and at the same time each day. Generally it is taken in the afternoon.
- The medication can be taken before or after food
- If a dose of medication is forgotten, it can be taken for up to 8 hours after the scheduled dose.
- If two or more doses are missed in a row, the prescribing physician should be notified for possible dose adjustments.

Monitoring Therapy

Warfarin interacts with many commonly-used drugs and foods which affect the way the drug works. Monitoring of dosing must be done regularly and fairly frequently to make sure the proper dose is being taken. Monitoring is done using a blood test called a prothrombin time (PT or usually referred to as “protime”). The results are usually converted to a standardized form called the INR (International Normalized Ratio). Testing has traditionally been done using blood drawn from a vein. However, there are now monitoring devices that

can use fingerstick blood much like those used for monitoring blood sugar levels in diabetics.

The longer it takes the blood to clot, the higher the protime result and INR. Generally the target range for the INR is 2 to 3, although other ranges may be chosen in special circumstances. If the INR is below the target range (below 2), there is a risk of clotting as the person is under-anticoagulated. If the INR is above the target range, there is an increased risk of bleeding.

Based on the INR result, the physician will adjust the dose of warfarin. After adjusting the medication, the blood is usually retested in one to two weeks. If the INR is stable, generally the test is done once a month.

Drug interactions

Many drugs interact with Warfarin causing the effectiveness of the drug to change. Some drugs which interact with warfarin include:

- Many prescription medications including metronidazole and many other antibiotics, barbiturates, Tegretol®, estrogens, antifungal medications, Prilosec®, sucralfate, and thyroid medications
- Acetaminophen
- Aspirin
- NSAID's such as Ibuprofen
- Antacids
- Laxatives
- Multi-vitamins which contain vitamin K
- Cough and cold medications
- Large amounts of vitamin E or C

Diet

Foods high in vitamin K such as beef liver, pork liver, green tea and leafy green vegetables inhibit the anticoagulant effect of warfarin. Once someone is stabilized on therapy, the diet should stay the same. Suddenly adding a lot of salads to the menu can affect the amount of warfarin needed for therapy. If plans are made to significantly alter a diet, the physician should be notified. More frequent blood tests used for monitoring the dose of warfarin may be ordered.

Avoid large amounts of:

- Asparagus
- Broccoli
- Brussels sprouts
- Cabbage
- Cauliflower
- Coleslaw
- Lettuce
- Okra
- Sauerkraut
- Spinach
- Turnip greens

Other interactions

1. **Metabolic problems:** Thyroid activity influences the dosing of warfarin. Hypothyroidism (a decrease in thyroid function) makes people less responsive to warfarin so higher doses are needed.
2. **Alcohol:** excessive use of alcohol affects metabolism and can lead to bleeding.
3. **Herbs and spices:** ginger, garlic, ginseng, and Ginkgo biloba are only a few of the herbs that can affect the metabolism of warfarin thus requiring adjustments in dose.

Side effects

As with all medications, warfarin can cause side effects. Some of the most common side effects seen with this drug include:

- Change in how things taste
- Tiredness
- Pale skin
- Hair loss
- Feeling cold

More severe or worrisome side effects which should be reported immediately include:

- Rash or hives
- Itching
- Difficulty with breathing
- Difficulty swallowing
- Swelling of the face, tongue, lips, eyes, etc.
- Hoarseness
- Chest pain or pressure
- Swelling of the hands, feet, or ankles
- Nausea or vomiting
- Fever or infections
- Diarrhea
- Loss of appetite
- Stomach pain
- Joint or muscle pain
- Feelings of numbness, tingling, burning, etc

Skin changes

Rarely, warfarin can cause death of skin tissue. If the skin develops ulcers, or purplish or dark areas, notify the physician.

Risks associated with warfarin

Abnormal bleeding:

Since warfarin is used to prevent clots from forming, it can also cause excessive or abnormal bleeding, especially if the dose is too high. Some things to watch for and report immediately are:

- Bleeding from cuts that won't stop after applying pressure for 20 minutes
- Bleeding from the nose, gums, or ears
- Large bruises that appear without reason or become larger and more swollen
- Vomiting or coughing up blood
- Blood in bowel movements
- Bloody urine which may look reddish or rusty in color
- Much heavier menstrual bleeding
- Sudden changes in speech or vision or any sign of a stroke

Activity limitations

Because anyone taking warfarin is at an increased risk for both spontaneous and trauma-induced bleeding, reasonable precautions to prevent injury should be followed.

- Reduce the risk of bleeding by:
 - Use a soft bristle toothbrush
 - Use waxed floss rather than unwaxed floss
 - Shave with an electric razor rather than a blade
 - Take special care with sharp objects such as knives
- Prevent falls
 - Remove loose rugs
 - Make sure electrical cords are not crossing areas of traffic
 - Use adequate lighting in all areas around the home to help prevent tripping
 - Avoid walking on ice, wet or polished floors, or other potentially slippery surfaces
- Limit participation in contact or collision sports, or in activities in which there is a high risk of serious trauma