

TREATMENT OF THROMBOSIS

Thrombosis is the medical term for an abnormal blood clot in an artery or vein. The body's ability to form blood clots is its natural defense against bleeding. Clots are formed through a series of chemical reactions between special blood cells (platelets) and proteins (clotting factors) in blood. The platelets and factors work together to regulate the clotting process to start and stop clotting as the body needs it. Sometimes the process does not work correctly, and a clot forms in blood vessels, blocking blood flow to the surrounding tissues. There are two main types of clots. How they effect the body depends on the type and location of the clot.

- **Arterial thrombosis**—the clot is in an artery, usually in the heart or brain, and causes a heart attack or stroke.
- **Venous thrombosis**—the clot is in a vein, usually one of the deep veins of the leg (deep vein thrombosis; DVT) and causes swelling and pain.

Clots can also break apart and travel to another part of the body and cause another blockage. When this occurs, it is called an embolus.

To treat blood clots and prevent the damage they cause, doctors use anticoagulants, which are commonly called blood thinners, to decrease the clotting power of the blood and prevent growth of a clot. The most common blood thinners used today are heparin, low molecular weight heparin, and warfarin.



The National Alliance
for Thrombosis
and Thrombophilia



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Treatment of Thrombosis

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Heparin

Heparin is a strong, fast-acting anticoagulant (blood thinner). It is usually given in the hospital by IV (a small needle inserted in a vein), but it can also be given by an injection under the skin. IV heparin works rapidly; within minutes of receiving it, most patients have excellent anticoagulation that will prevent further clotting. However, patients who get heparin must be monitored every day with a blood test to see if the correct dose is being given. The doctor will adjust the dose of heparin according to the blood test results. Because heparin levels often change in patients, the doctor must check levels frequently. The name of the blood test used to check a patient's heparin level is the activated partial thromboplastin time (aPTT).

For patients who have a new clot, heparin is usually given with another anticoagulant, warfarin (Coumadin®). Warfarin is a pill that patients can take at home for long term anticoagulation. Because it can take 5-7 days (or longer) for the warfarin to take effect, patients will initially take both drugs. Once the warfarin is fully active, the heparin is stopped and the patient can go home from the hospital.

The advantages of heparin are its low cost and fast action (blood can be anticoagulated quickly). The disadvantages of heparin include the need for frequent blood tests to check the levels of anticoagulation and hospitalization to get an IV drug. Patients should expect to be in the hospital 5-10 days to treat a new clot.

The most serious side effect of heparin is bleeding. Other side effects include skin rash, headache, cold symptoms, and stomach upset. A less common side effect is loss of bone strength if patients are on heparin for long periods of time (usually months). This is generally only a problem for pregnant women. A rare side effect of heparin is a condition called Heparin Induced Thrombocytopenia (HIT). HIT is sometimes incorrectly called "heparin allergy." It occurs in a small number of patients, but it has very serious symptoms including worsening of clotting and developing new clots, which can lead to stroke, heart attack, deep vein thrombosis, and death.

Low Molecular Weight Heparins

Low molecular weight heparins (LMWH) are a fairly new drug class that is similar to heparin but much easier to

use. The drugs available in the U.S. are Dalteparin (Fragmin®), Enoxaparin (Lovenox®), and Tinzaparin (Innohep®). Using LMWH has two advantages over heparin:

- Patients can be treated at home, because LMWH is given by an injection under the skin. This eliminates or reduces the time patients need to spend in the hospital to treat their clot.
- Patients generally do not need to be monitored with a blood test when they are taking LMWH.

The side effects of LMWH are very similar to heparin; however, HIT and osteoporosis are much less common. LMWH is expensive.

Warfarin

Warfarin (Coumadin®) is an anticoagulant pill that is taken by mouth. Patients are given warfarin for different reasons. Some patients may take warfarin for a few weeks; others will need to take warfarin the rest of their lives. The length of treatment depends on the reason why a patient needs anticoagulants.

Warfarin works by slowing down the process in the liver that uses vitamin K to make certain proteins (clotting factors) that cause clotting. Because it may take several days before warfarin becomes completely effective, heparin or LMWH is given until the warfarin is working.

As with patients who take heparin, patients taking warfarin need to have their blood tested to see how well the drug is working and to be monitored for safety. This blood test measures how long it takes blood to clot, and is also called a prothrombin time, protime, INR, or clotting time. Because different labs use different methods to measure clotting time, the results of the test can vary. To make sure a doctor can correctly interpret this test, the results are reported with an INR number (International Normalized Ratio) that converts all clotting times to the same number. People who are not taking warfarin have an INR around 1.0 (usually between 0.8 and 1.2). Most patients on warfarin should have an INR between 2 and 3; this is considered their therapeutic range. In some patients, a higher or lower INR range is targeted. If a patient has an INR that is below their therapeutic range, the risk of clotting is higher; if a patient has an INR above the therapeutic range, the risk of bleeding is higher. When patients first start warfarin, they may get their blood tested two or three times a week. Once patients are on a regular dose of warfarin, they may go as long as 4 weeks between blood tests.

Bleeding is the most common side effect of warfarin. Other side effects include headache, rash, hair loss, skin necrosis, purple toe syndrome, and elevated liver enzymes. Sometimes these side effects will go away over time; however, it is important to discuss any of these side effects or unusual symptoms with your health care provider. If the side effects do not go away, your doctor may prescribe a different blood thinner.

Points to remember about taking warfarin:

- **Keep your diet consistent.** Many foods, especially green vegetables, have vitamin K in them.
- **Tell the doctor, nurse, or pharmacist who is monitoring your INR if you start a new medication.** Some medications, especially antibiotics, can raise or lower your INR. Over-the-counter anti-inflammatory medications (such as aspirin or ibuprofen) may increase your risk of bleeding. You can usually take acetaminophen (Tylenol®). But if you take acetaminophen more than once a day and for longer than a week, you should tell the provider monitoring your INR.
- **Taking herbal medications while taking warfarin is discouraged.** Many herbal medicines will interact with warfarin and change your INR. Some of these medications have anticoagulant properties and may put you at greater risk for bleeding. Many herbal products do not list all of their ingredients and may not work as advertised. If you must take an herbal medication, it is important that the provider monitoring your INR knows what you are taking.
- **Take warfarin at the same time every evening.** The evening is the best time to take warfarin because any medication changes can be made during the day. If you miss taking a dose of your warfarin, you have 8 hours to take the medication; the dose should be skipped after 8 hours.
- **Limit alcohol intake.** Drinking a light or moderate amount of alcohol (1-2 glasses of wine or 1-2 beers per day) usually does not influence the INR and will not increase the risk for bleeding. However, drinking a large amount can affect the way warfarin works and increase your risk for bleeding.