A Patient's Guide to Primary and Secondary Prevention of Cardiovascular Disease Using Blood-Thinning (Anticoagulant) Drugs

What Is Cardiovascular Disease?

- Cardiovascular disease (CVD) is a broad term that covers any disease of the heart and circulatory system (arteries and veins).
- CVD includes coronary artery disease (blockage of blood vessels that serve the heart), acute coronary syndrome (symptoms such as pain, weakness, and tiredness caused by coronary artery disease), angina pectoris (pain resulting from coronary artery disease or other causes), myocardial infarction (heart attack, with damage to heart muscle caused by coronary artery disease), and left ventricular thrombus (blood clot in the left side of the heart that pumps blood into your body).

What Does "Cardiovascular" Mean?

- Cardiovascular means the heart, and the arteries and veins of the heart, that circulate your blood throughout your body.
- CVD can also affect other organs of your body, including your brain, lungs, and kidneys.

What Do "Primary" and "Secondary" Mean?

- Primary prevention means preventing CVD before it occurs.
- Secondary prevention means preventing additional attacks of CVD after the first attack has occurred.

What Are Blood-Thinning Drugs?

- Blood-thinning (also called anticoagulant) drugs are medications given to prevent the blood from forming harmful blood clots.
- Clotting of blood is necessary to stop bleeding after injury. Clotting can be harmful if it contributes to conditions such as CVD. For example, a blood clot in an artery serving the heart may contribute to a heart attack. Blood-thinning drugs are prescribed to prevent harmful blood clotting.

What Is a Blood Clot?

- A blood clot is formed by blood cells and non-cell blood components sticking together to form a solid mass (a clot). A clot can wholly or partially block a blood vessel.

How Do Blood-Thinning (Anticoagulant) Drugs Work?

- There are a number of blood-thinning drugs that work in different ways to prevent harmful blood clotting.
- Most of the blood-thinning drugs used for primary and secondary prevention of CVD are antiplatelet agents. They work by reducing the "stickiness" of platelets, the blood cells most responsible for forming blood clots. By reducing platelet "stickiness," the drugs make platelets less able to stick together to form blood clots. Aspirin was the first, and still widely used, antiplatelet blood-thinning drug. Some other antiplatelet drugs are clopidogrel (Plavix), ticagrelor (Brilinta), prasugrel (Effient), and cilostazol (Pletal).

- Warfarin (Coumadin) is a widely used blood-thinning drug called a vitamin K antagonist. It works by reducing the effectiveness of vitamin K in blood coagulation. Vitamin K is essential for blood coagulation and the forming of blood clots.

What Is the Upside and Downside of Using Blood-Thinning Drugs?

- The upside: Blood-thinning drugs are helpful, and even essential, for the primary and secondary prevention of CVD.
- The downside: Blood-thinning drugs increase the risk for bleeding due to injury or disease. This is because "thinned" blood congeals less easily and is less able to form a blood clot. Risk for bleeding is reduced by monitoring, as recommended by your physician.

What Is Done for Primary Prevention of CVD?

- Primary prevention is preventing a disease from occurring. Primary prevention of CVD includes preventing the blockage of arteries that bring blood to the heart (coronary artery disease).
- Coronary artery disease is a complex disorder with a number of known causes. Among these are conditions that can narrow coronary arteries with build-up of cholesterol and cellular material.
- Coronary arteries can be additionally narrowed, or completely blocked, by blood clots. Complete blockage can cause a heart attack (myocardial infarction). Partial blockage can cause cardiovascular symptoms (acute coronary syndrome, angina pectoris).
- Prevention of blood clots in coronary arteries can be essential for primary prevention of CVD. The use of blood-thinning drugs may be included in a comprehensive strategy for primary prevention. Preventive strategy may also include the management of blood cholesterol level, blood glucose level, and body weight, and physical conditioning.

Why Is Aspirin the Blood-Thinning Drug of Choice for Primary Prevention of CVD?

- On the basis of results from many studies and clinical trials, aspirin is the blood-thinning drug most often recommended for primary prevention of CVD. The recommended preventive dose is usually 75 to 100 mg taken daily.
- Primary prevention usually requires that you take this low dose of aspirin for as long as your physician tells you to take it—often over many years—as long as your risk factors indicate you are at risk for CVD.

Are You a Candidate for Primary Prevention of CVD?

- This decision is made by your physician on the basis of your medical history (your risk for CVD and your risk for bleeding with aspirin), your family medical history (any "heart trouble" in your family), physical examination, and results of laboratory tests.
- This information helps your physician decide if you are a candidate for primary prevention of CVD.

What Is Done for Secondary Prevention of CVD?

- Secondary prevention of CVD is (1) prevention of a second occurrence of CVD (eg, after a first occurrence of acute coronary syndrome or a first heart attack), or (2) prevention of a second occurrence of CVD and blood clotting complications after surgical procedures used to treat the CVD.

What Surgical Procedures Are Used to Treat CVD?

- Coronary artery angioplasty uses a catheter and "balloon" threaded through a blood vessel to open a narrowed coronary artery. The balloon and catheter are withdrawn after the procedure. Secondary prevention aims to prevent the formation of blood clot that would again narrow the artery.
- Coronary artery bypass graft surgery bypasses a plugged coronary artery with a segment of blood vessel obtained from elsewhere in the body, often from one of the patient's legs. Secondary prevention aims to prevent the formation of blood clot in the grafted vessel.
- Stent insertion is the insertion of a permanent metal slotted tube (a stent) into a plugged coronary artery to keep the artery open. Some stents are bare metal. Some are coated with a blood-thinning antiplatelet drug such as clopidogrel to prevent blood clotting in or around the stent. Secondary prevention with blood-thinning drugs is designed to keep the stent from becoming plugged with a blood clot.

What Specific Blood-Thinning Drugs Are Prescribed for Secondary Prevention of CVD?

- The choice of blood-thinning drugs for secondary prevention of CVD is individualized to each patient. Expert recommendations suggest the best choices.
- The duration of blood-thinning therapy for secondary prevention is also individualized to each patient. Expert recommendations suggest optimal durations for therapy.
- The choice of blood-thinning drugs and duration of therapy may change over time as the patient's need for therapy changes.

What Are Some Examples of Blood-Thinning Therapy for Secondary Prevention of CVD?

- Examples are just that—examples based on recommendations of experts reviewing all relevant data. An example does not necessarily apply to any individual patient.
  - *Example: A patient with established coronary artery disease and an episode of acute coronary syndrome, but no heart attack, may benefit from long-term low-dose aspirin therapy or long-term therapy with the antiplatelet drug clopidogrel.*
  - *Example: A patient who had surgical placement of a stent in a coronary artery, after an episode of acute coronary syndrome, may benefit from intermediate-term therapy with low-dose aspirin and another antiplatelet drug such as clopidogrel.*
  - *Example: A patient who had a heart attack (myocardial infarction) and blood clot in the left ventricle may benefit from therapy with warfarin.*
- There are many other examples, but remember that no example may apply specifically to any individual patient.

For additional information:

Antithrombotic therapy and prevention of thrombosis: American College of Chest Physicians evidence-based clinical practice guidelines, 9th edition. Chest. 2012;141(2 suppl):48S-52S.

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