

CHAPTER 4 DEEP VEIN THROMBOSIS PREVENTION

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Introduction

Deep vein thrombosis (DVT) and **pulmonary embolus (PE)** are serious conditions. **Venous thromboembolism (VTE)**, which is either **DVT** or **PE**, is the 4th leading cause of death in Western society. People who get a **DVT** have a 30% chance of getting a second **DVT** within 10 years. Thus, preventing **VTE** is very important. This chapter will discuss the main ways to prevent a **DVT** or **PE**.

Risk Factors

There are many factors that can increase one's risk for **VTE**. The biggest risk factors include hospitalization, surgery, cancer and **hypercoagulable disorders** (factors in your blood that increasing your chance of developing blood clots).

Prevention of DVT and PE

There are two types of **DVT** and **PE** prevention. The first is called "**mechanical**" and the second is called "**pharmacologic**", which means through the use of medication. **Mechanical prevention** includes the use of **compression stockings**, leg elevation, **sequential compression devices (SCD's)**, ambulation, and **vena cava filters**. **Compression stockings** are tight elastic stockings that are worn by people in the hospital or by people who can't be active to prevent a **blood clot**. They work by decreasing the "pooling" of blood in the legs. Leg elevation and **SCD's** work the same way. **SCD's** are plastic devices that are fit on the legs, and they inflate in a sequential way (i.e. from bottom to top) in order to empty the **veins** in the legs. These methods have been shown to decrease the number of **DVT's** in hospitalized patients by 20%.

Vena cava filters are another form of **mechanical prevention**. The vena cava is the large vein in the abdomen that brings blood back to the heart and lungs. A **vena cava filter** is a metal device that resembles an umbrella. This can be placed in the vena cava to catch any clots that might break off from the legs, and prevent it from going to the heart. This filter can't prevent **DVT**, but it can prevent **PE**. This device is generally used in patients who have a **DVT**, or who are at high risk of **DVT**, but can't get **blood thinners** for one reason or another.

Pharmacologic prevention basically includes **blood thinners**. The most common type of **blood thinner** used to prevent **VTE** is **heparin**. There are 2 forms of heparin: **unfractionated heparin**, which is given IV, and **fractionated heparin** (also known as **low molecular weight heparin, LMWH**) which is given by an injection under the skin. Another type of **blood thinner** given by injection is called **Fondaparinux**. This is a

synthetic heparin-like drug. There are also a few other medications that can be given to prevent clot in those people who are allergic to heparin. These are called **lepirudin**, **bivalirudin** and **argatroban**. Which of these medications is used for clot prevention depends on the patient and the situation.

Another commonly known blood thinner is **Coumadin** (also known as **Warfarin**). **Coumadin** is not generally used to prevent **VTE** in a patient who has not had **VTE** in the past, but it is used to prevent recurrent **VTE** in a patient who has already had one.

Aspirin, Plavix, or other drugs that affect platelet function, are not used to prevent **VTE**. They are not as effective as the other medications already mentioned.

Who should get preventative treatment?

There are very well established recommendations for who should get **VTE** prevention. For patients who are having surgery, the recommendation for preventative treatment depends on the type of surgery, the age of the patient, and whether or not the patient has risk factors for clot formation. This risk stratification is described below.

Low Risk Patients

Patients who are having low risk surgery (usually surgery that lasts less than 30 minutes, or is not extensive), who are under 40, and who have no other risk factors are considered low risk for developing **VTE**. These patients generally don't need medication for **VTE** prevention. They are encouraged to walk early after surgery.

Moderate Risk Patients

Patients who are having major surgery, who are older than 40, but have no additional risk factors are considered moderate risk. These patients are also encouraged to walk early if possible after surgery, but they are also given low dose **blood thinners** (usually either **unfractionated heparin** or **LMWH**) around the time of surgery.

High Risk Patients

Patients who are having major surgery, who are older than 40, or have additional risk factors are considered high risk. These patients are encouraged to walk early if possible, to wear compression stockings, and to get low dose **blood thinners** around the time of surgery.

Very High Risk Patients

Patients older than 40, who are having major surgery, and have major additional risk factors (examples: cancer history, paraplegia, hip or knee surgery, known clotting disorder), are considered very high risk. Not only should these patients be given **blood thinners** around the time of surgery, they should also have **SCD's** on, and can also be asked to wear **compression stockings**.

Non Surgical High Risk Patients

Hospitalized patients who are not having surgery are also at risk for **VTE**. The highest risk is in those patients with severe heart failure, chronic obstructive lung disease, severe infection, cancer or paralysis. Risk also increases with age, and is higher in patients who have had a **VTE** episode in the past.

Are there special circumstances that change the risk of DVT?

Hip or Knee Replacement Surgery

Patients undergoing hip replacement surgery or knee replacement surgery are at especially high risk for **DVT** and **PE**. Often these patients are given higher doses of **blood thinners** around the time of their surgery to help prevent clot formation. This must be balanced with the risk of **bleeding** if too much **blood thinner** is used. However, the vast majority of these patients should have **blood thinners** around the time of surgery.

Neurosurgery

Any **bleeding** after brain surgery or back surgery could be very dangerous, therefore **blood thinners** are not generally used in most of these patients. Because the consequences are so high if there is any **bleeding**, **SCD's** with or without **compression stockings** are used for clot prevention. In those patients who are at high risk for clot formation, low doses of **blood thinners** may be used around the time of surgery.

Trauma

Patients who have had severe trauma are at high risk for clot formation. Many of these patients cannot get **blood thinners** because of the risk of **bleeding**. In those patients, a **vena cava filter** may be used along with compression stockings and **SCD's**.

How long preventative measures should be given?

In general, the preventative measures, whether it be mechanical or medications, should be continued until the risk is over or significantly decreased. This is generally thought to be once a hospitalized patient is walking several times per day. In a patient with cancer, the prevention should be continued until the cancer is in remission.

Conclusion

DVT and **PE** are one of the most preventable causes of death and disability. Prevention should be used appropriately, and if it is, **DVT** and **PE** can be prevented in most patients.