The Facts

An *embolus* is a particle that moves about in our blood vessels, either in the veins or arteries. Most emboli are composed of clotted blood cells. A blood clot is called a *thrombus* and a moving blood clot is called a *thromboembolus*.

As an embolus moves through the body's blood vessels, it's likely to come to a passage it can't fit through. It lodges there, backing up blood behind it. The cells that normally get their blood supply via this passage are starved of oxygen (*ischemia*) and die. This condition is called an *embolism*.

Types of embolism

There are several types of embolism:

- **pulmonary embolism:** An embolus, usually formed in the leg (sometimes known as a *deep vein thrombosis* or *DVT*), lodges in one of the arteries of the lungs. Many emboli are broken down by the body and go away by themselves; however, serious pulmonary embolism may cause death.
- **brain embolism:** If a blood clot travels to the brain, this causes an ischemic stroke or TIA (transient ischemic attack).
- **retinal embolism:** Small clots that wouldn't block a major artery can block the smaller blood vessels feeding the retina at the back of the eye. The result is usually sudden blindness in one eye.
- **septic embolism:** This occurs when particles created by infection in the body reach the bloodstream and block blood vessels.
- **amniotic embolism:** Not all emboli are made of clotted blood. In pregnancy, the womb is filled with amniotic fluid, which protects the fetus. Amniotic fluid can embolize and reach the mother's lungs, causing pulmonary amniotic embolism.
- **air embolism:** Scuba divers who rise to the surface too rapidly can generate air embolism, bubbles in the blood that can block arterial blood flow.
- **fat embolism:** If fat or bone marrow particles are introduced into the blood circulation, they may block blood vessels the way a blood clot or air bubble can.

Causes

Most embolisms happen to people who have risk factors for blood clot formation, such as smoking and heart disease. Other risk factors for other types of emboli include high blood pressure, atherosclerosis (buildup of fatty plaque in the blood vessels), older age, high cholesterol, and obesity.

The primary cause of most pulmonary embolisms is *deep vein thrombosis* (DVT). This is a condition in which the veins of the legs develop clots. Natural agents in the blood often dissolve small clots without causing any effects of blockage. Some clots are too big to dissolve and are big enough to block major blood vessels in the lungs or in the brain.

Factors that slow blood flow in the legs may promote clotting. People can develop a DVT or pulmonary emboli after sitting still on long flights or after immobilization of the leg in a cast, or after prolonged bed rest without moving the legs. Other factors associated with DVT or pulmonary embolism include cancer, previous surgery, a broken leg or hip, and genetic conditions affecting the blood cells that increase the chance of blood clot formation.

Symptoms and Complications

The symptoms of pulmonary embolism can be mild or severe. People with other health conditions such as chronic obstructive pulmonary disease (COPD) or coronary artery disease (CAD) may experience more severe symptoms. Some people have many small emboli that can only be detected by special X-ray techniques. A serious blockage, however, can lead to severe breathing difficulty or death.

Symptoms of pulmonary embolism appear suddenly and include:

- shortness of breath, rapid breathing, or wheezing
- bloody sputum
- cough
- lightheadedness, dizziness, fainting
- sharp chest pain or back pain

In older people, pulmonary embolism may appear first as confusion or reduced cognitive abilities. This can result from the heart suddenly being unable to deliver oxygen-rich blood to the brain and other parts of the body.

Making the Diagnosis

There are several tests that may be done to diagnose a pulmonary embolism. In addition to a chest X-ray, a *ventilation perfusion* (V/Q) scan may be performed to see if anything is blocking blood flow through the lungs. Other tests include CT scan or pulmonary angiography. For deep vein thrombosis, Doppler studies of the legs, venograms, or a blood test that measures for a substance called *D-dimer* may be done to detect a blood clot. For strokes, brain scans, angiography, or Doppler ultrasound studies may be used to detect arteries blocked by a blood clot.

Treatment and Prevention

The treatment for thrombo embolism (blood clot embolism) involves anticoagulant or thrombolytic medications. Anticoagulants, such as heparin*, low molecular weight heparin, warfarin, or *factor Xa inhibitors*, are the main medications given for pulmonary embolism. Factor Xa inhibitors include medications such as apixaban, rivaroxaban, fondaparinux, edoxaban and dabigatran. These agents are effective in preventing clot formation and have less side effects compared to warfarin. *Thrombolytics* such as alteplase and streptokinase help the body to dissolve the original clot.

Non-medication methods to help prevent DVT include using compression devices and compression stockings (to ensure blood doesn't pool in the legs), and frequently stretching, massaging, and moving your lower leg muscles if you are inactive for a long time. You can also reduce your risk factors for getting blood clots, for instance by quitting smoking and controlling your blood pressure.