

PULMONARY EMBOLISM

OBJECTIVES:

- 1) To learn or review what pulmonary embolism is.
- 2) To learn or review the signs and symptoms of pulmonary embolism.
- 3) To learn or review the causes of pulmonary embolism.
- 4) To learn or review the risk factors of pulmonary embolism.
- 5) To learn or review the treatment of pulmonary embolism

WHAT IS PULMONARY EMBOLISM?

Pulmonary embolism is a condition that occurs when an artery in your lung becomes blocked. In most cases, the blockage is caused by one or more blood clots that travel to your lungs from another part of your body.

- A) Most of these blood clots originate in the legs, but they can also form in the arm veins, the right side of the heart, or even at the tip of a catheter placed in a vein. In rare instances, other substances such as a globule of fat, tissue from a tumor, or a clump of bacteria, may lodge in the arteries of the lungs.
- B) Pulmonary embolism is a serious condition that can cause:
- * Permanent damage to part of your lung from lack of blood flow to lung tissue.
 - * Low oxygen levels in your blood.
 - * Damage to other organs in your body from not getting enough oxygen.
- C) In most cases, pulmonary embolism is a complication of a condition called deep vein thrombosis (DVT). In DVT, blood clots form in the deep veins of the body; most often in the legs. These clots can break free, travel to the lung, and block an artery.
- D) In the majority of cases, a pulmonary embolism is not fatal. However, if a clot is large, or if there are many clots, a pulmonary embolism can cause death. More than 600,000 people in the United States have a pulmonary embolism each year and more than 60,000 of them die. Most of those who die do so within 30-60 minutes after symptoms start.

SIGNS AND SYMPTOMS

The symptoms of pulmonary embolism can vary greatly, depending on how much of your lung is involved, the size of the clot and your overall health; especially the presence or absence of underlying lung or heart disease. Large clots or many clots are life threatening and cause more severe symptoms. Smaller clots cause fewer symptoms or no symptoms at all.

Common signs and symptoms:

- Sudden onset of shortness of breath, either when you are active or at rest.
- Chest pain that often mimics a heart attack. The pain can occur anywhere in your chest and may radiate to your shoulder, arm, neck, or jaw. It may be sharp and stabbing or aching and dull and may become worse when you breathe deeply, cough, eat, bend or stoop. The pain will get worse with exertion but will not go away when you rest.
- A cough that produces bloody or blood-streaked sputum.

General, less specific signs and symptoms may occur, including:

- Anxiety or feelings of dread.
- Lightheadedness.
- Fainting.
- Rapid breathing.
- Increased heart rate (tachycardia)
- Excessive sweating.
- Wheezing.
- Clammy or bluish-colored skin.
- Leg swelling.
- Weak pulse.

Signs and symptoms of DVT:

- Swelling of the leg or swelling along the vein in the leg.
- Pain or tenderness in the leg. The pain is usually only in one leg. You might only have pain when standing or walking.
- Feeling of increased warmth in the area of the leg that is swollen or that hurts.
- Red or discolored skin on the affected leg.

CAUSES OF PULMONARY EMBOLISM

Blood is constantly being pumped from the right side of your heart to the lungs and back to the left side of your heart. In your lungs, blood picks up oxygen and releases carbon dioxide, a waste product of metabolism. Blood vessels called arteries take the oxygen-rich blood to tissues throughout your body, and veins bring oxygen-poor blood back to the heart. Capillaries, the smallest blood vessels, connect the veins and arteries.

Clots that form in the veins can dislodge, travel through the bloodstream to the right side of the heart, and then enter the pulmonary arteries, where they may cause a blockage. A blockage can occur in any small artery, but the lungs are especially vulnerable because all of the blood in the body passes through the lungs every time it circulates. Most often, a number of clots will develop over a period of minutes or hours and spread to all parts of your lungs; it is unusual for just one clot to occur.

Factors involved in clot formation:

- **Surgery.**
Operations are one of the leading causes of problem blood clots, especially operations to replace major joints, such as the hip and knees. Although people slated for high-risk operations are treated with anti-clotting drugs, both before and after surgery, many still develop clots.
- **Long periods of inactivity.**
Prolonged bed rest or long plane or car trips decreases blood flow in your veins, making clots more likely.
- **Increased levels of clotting factors in the blood.**
Some types of cancer, especially pancreatic, lung, and ovarian cancers, cause increased blood levels of procoagulants---substances that contribute to blood clotting. The female hormone estrogen found in birth control pills and hormone therapy also increases the amount of clotting factors in the blood.
- **Certain medical conditions.**
People who have cardiovascular disease associated with clot formation such as heart attack or stroke, are more likely to develop blood clots in their veins.
- **Injury to the veins.**
This may occur during certain surgical procedures, especially hip surgery or knee replacement. It may also result from direct injuries to the legs or from pelvic fractures.

RISK FACTORS OF PULMONARY EMBOLISM

Although anyone can develop blood clots and subsequent pulmonary embolism, the following are risk factors:

- *Inactivity*-You are not likely to develop a blood clot after an evening on the couch with a good book, but prolonged sitting in a cramped position during lengthy plane or car trips ups your risk.
- *Prolonged bed rest*-Being confined to bed for an extended period after surgery, a heart attack, leg fracture or any serious illness makes you far more vulnerable to blood clots.
- *Certain surgical procedures*-Hip and knee replacements, some obstetric or gynecological procedures and extensive abdominal operations.
- *Certain medical conditions*-Certain cancers, especially pancreatic, ovarian, and lung cancers can increase levels of substances that help blood clot, and chemotherapy further increases the risk. Menopausal women with a history of breast cancer who are taking tamoxifen or raloxifene also are at risk. High blood pressure and cardiovascular disease make clot formation more likely, as does having an inflammatory bowel disease such as ulcerative colitis or Crohn's disease.
- *Being overweight*-Researchers link the formation of blood clots to leptin, a hormone produced by fat cells in the body, making people who are overweight more prone to develop clots.
- *Pacemakers or venous catheters*.-Having a pacemaker or catheter in a central vein makes the formation of clots more likely.
- *Pregnancy or childbirth*-Pulmonary embolism is the most frequent cause of death associated with childbirth. Some women who have pregnancy-related venous thromboembolism also have an inherited clotting disorder.
- *Birth control pills*-Estrogen in birth control pills increase clotting factors in your blood, especially if you smoke or are overweight. On the other hand, the risk of clots from birth control pills is small compared with the risks associated with pregnancy.
- *Family history*-Having a personal or family history of venous thromboembolism increases the risk of blood clots.
- *Smoking*-For reasons that are not well understood, tobacco use predisposes some people to blood clot formation, especially when combined with other risk factors.

TREATMENT OF PULMONARY EMBOLISM

Treatment may include :

- Medicines: Anticoagulants or blood thinners such as warfarin or heparin
- Emergency treatment to dissolve a clot: When pulmonary embolism is life threatening, doctors may use treatments to remove or break up clots in the lungs. These treatments are given in the emergency room or in the hospital and include:
 - 1) Thrombolytics
 - 2) Surgery to remove the clots.
 - 3) A new procedure that uses a catheter to reach the clots. The catheter is inserted into the upper thigh (groin) or arm and threaded to the clot in the lung. The catheter may be used to extract the clot or deliver medicine to dissolve it.

KEY POINTS:

- A) A pulmonary embolism is a blockage of an artery in the lung, usually due to a blood clot that traveled to the lung from the leg.
- B) In most cases, pulmonary embolism is a complication of a condition called deep vein thrombosis.
- C) A pulmonary embolism blocks blood flow to part of the lung. It can be a life-threatening condition.
- D) Each year, more than 600,000 people in the US have a pulmonary embolism and more than 60,000 of them die.
- E) Pulmonary embolism is one of the most common causes of death in hospitalized people who must remain in bed for a long period of time.
- F) The greatest risk for pulmonary embolism occurs in people who have or previously have had DVT, or who have previously had a pulmonary embolism.
- G) Pulmonary embolism occurs equally in men and in women.
- H) Your risk for pulmonary embolism doubles every 10 years after age 60.
- I) More than half of the people who have pulmonary embolisms, have no symptoms.
- J) When present, the most common symptoms are sudden onset of SOB, chest pain that gets worse with a deep breath, coughing, or chest movement, and the coughing up of blood.
- K) Treatment varies depending on how severe your symptoms are. Some people need immediate emergency treatment while others can be treated as outpatients.
- L) Treatment usually includes anticoagulant medicines (blood thinners), such as warfarin and heparin, which help prevent clots from forming and help keep clots from getting larger.