Pulmonary Embolism

Jill Parker
jap_616@yahoo.com

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn

Recommended Citation
Parker, Jill, "Pulmonary Embolism" (2017). Nursing Student Class Projects (Formerly MSN). 269.
https://digitalcommons.otterbein.edu/stu_msn/269

This Project is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Nursing Student Class Projects (Formerly MSN) by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact digitalcommons07@otterbein.edu.
Introduction

The topic of Pulmonary Embolism (PE) was selected because the author, Jill Parker, BSN, RN, works in the Riverview Hospital Emergency Department (ED). In the ED, diagnosis of Pulmonary Embolism is common, and are often not recognized until the patient arrives with chest pain or shortness of breath. However, correct diagnosis and treatment of PEs are very important.

By creating this paper, the author hopes to provide a summary of current literature and to educate nurses about the symptoms of a Pulmonary Embolism, the importance of recognizing the condition, and an explanation about why this topic is significant. This important information, together with information about treatment and prevention, can serve as an accessible way to help educate patients about the condition.

As an Advanced Practice Nurse, the author plans to continue working with emergent patients with chest pain and acute diagnostic and treatment skills are crucial. Patient education is an important resource in recognizing symptoms of PEs and knowing that they require immediate treatment.

Prevalence of PE

Pulmonary embolism, together with deep venous thrombosis (DVT), are often referred to as venous thromboembolism. In the United States, the estimated annual incidence of all PE is about 100,000, with approximately 100,000 people developing DVT each year, of that number, 60,000 to 100,000 die. Pulmonary embolism is a leading cause of death in the United States, occurring in one end of the spectrum, patients may experience life-threatening symptoms of PE, while others may present with a set of nonspecific symptoms. However, early diagnosis and treatment of PEs are very important. It is important for the general population to understand the symptoms that might indicate PE. These include leg pain, swelling, or both, either in the calf, shortness of breath, chest pain, fever, excessive sweating, disorientation, or clammy skin, shortness of breath, and a new or irregular heartbeat (Pulmonary embolism: Overview - Mayo Clinic, 2016).

There are both acquired and genetic risk factors for PE. Acquired factors include immobilization, the use of oral contraceptives or hormone replacement therapy, old age, a malignancy, trauma or fracture, pregnancy or having recently given birth, as well as obesity, and certain types of cardiac or endocrine disease, and a prior history of or family history of DVT. The use of central venous catheters or peripheral central catheter lines, immobilization, and postoperative infections are also conditions that carry a high risk of PE (Shapero & Bhatt, 2016, p. 36).

Figure 1. Pathophysiology of Pulmonary Embolism

Patients with a pulmonary embolism often present with a set of nonspecific symptoms. Therefore, it is important for the general population to understand the symptoms that might indicate PE. These include leg pain, swelling, or both, either in the calf, shortness of breath, chest pain, fever, excessive sweating, disorientation, or clammy skin, shortness of breath, and a new or irregular heartbeat (Pulmonary embolism: Overview - Mayo Clinic, 2016).

However, the actual diagnosis of PE requires careful clinical judgment. At one end of the spectrum, patients may be completely asymptomatic, while at the other end they may present with cardiovascular shock. Other symptoms that indicate more severe PE include hypotension, hypo- or hyperglycemia, elevation of B-type natriuretic peptides or N-terminal pro-B-type natriuretic peptides or troponins, and ECG changes that suggest right ventricular strain (Shapero & Bhatt, 2016, p. 36).

There are both acquired and genetic risk factors for PE. Acquired factors include immobilization, the use of oral contraceptives or hormone replacement therapy, old age, a malignancy, trauma or fracture, pregnancy or having recently given birth, as well as obesity, and certain types of cardiac or endocrine disease, and a prior history of or family history of DVT. The use of central venous catheters or peripheral central catheter lines, immobilization, and postoperative infections are also conditions that carry a high risk of PE (Shapero & Bhatt, 2016, p. 36).

Figure 1. Pathophysiology of Pulmonary Embolism

A pulmonary embolism that travels to the heart causes cardiac failure due to asinine increase in blood pressure on the right ventricle as well as an inadequate blood supply. That leads to increased right ventricle volume, which results in a decreased left ventricle preload, which in turn causes decreased Cardiac Output (CO) and Mean Arterial Pressure (MAP). This leads to decreased right ventricular coronary blood flow and pressure (CPP), which starts the cycle over again. (Wood, 2002, p. 881-882).

Pathophysiological Processes

Genetic risk factors include protein C or D deficiency, antithrombin deficiency, factor V Leiden and prothrombin 20210A gene variants, non-A blood groups (Coleman, Oli & Henke, 2015, p. 2-3).

Underlying Pathophysiologic Processes

The basic underlying cause of PEs is a blockage in one of the pulmonary arteries. Usually, blood clots originate in the legs, break off, and travel to the areas where they block blood flow. At a high level of view this process is illustrated in Figure 2 (“Pulmonary embolism: Overview - Mayo Clinic,” 2016).

Currently scientific thinking suggests that the embolism event occurs at the wall of the vein. This includes the inflammatory response to, as well as the cause of the clot formation. After a vascular injury, platelets form a hemostatic plug and start the aggregation process. A platelet plug is formed, and then coagulation protein assemblies and form a clot (Coleman, Oli & Henke, 2015, p. 4). If the blood clot breaks off and passes to the heart, it can cause cardiac failure. The underlying pathophysiological process of that embolism event is described in Figure 1 (Wood, 2002, p. 802).

Signs and Symptoms

The diagnosis has implications to nursing care, as nurses must be able to educate patients about the causes and effects of the condition, the importance of treatment and follow-up care, and emphasize steps to take to avoid another PE. Nurses should assess and discuss each patient’s risk factors and ways to specifically lower chances of a recurrence of the condition. In addition, they should ensure they recognize any warning signs and(new symptoms) in an attempt to reduce the high incidence of morbidity and mortality in patients with a pulmonary embolism, as well as that difficulty in diagnosis, it is important that at-risk patients be screened for PE. The pathophysiology that leads to PE is significant, because of the consequence and risk associated with the diagnosis. PE patients who have been treated have approximately an 80% mortality rate, and in untreated patients the mortality rate can be as high as 30% (Deng, Li, Zhou, Liu, et al., 2015, p. 1). Therefore, detection and prevention of PE is critical.

Conclusion

The diagnosis of pulmonary embolism event is difficult, but the condition is common and can have very serious consequences. Doctors and Advanced Practice Nurses must be aware of the underlying pathophysiology of the condition so they can effectively diagnose and treat it. In addition, this knowledge helps to educate patients about risk factors, symptoms of the condition, the importance of treatment, and ways to prevent a recurrence.

References

Pulmonary embolism: Overview - Mayo Clinic, (2016, August 8).