Pulmonary Embolism

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Introduction

The pathophysiologic topic of acute pulmonary embolism was chosen to increase the knowledge base and provide additional information to assist with moving forward from a registered nurse to an Advance Practicing Nurse. Working as a full-time registered nurse in the emergency department, the working knowledge of the diagnosis of acute pulmonary embolism is something that is ruled out on many occasions with complaints of shortness of breath, chest pain, or decrease in pulse. Since a patient with an acute pulmonary embolism can have both typical and atypical symptoms, the death rate can be very high, if not caught early enough. An acute pulmonary embolism can result in death with such high death rate, then that of a patient with a myocardial infarction. The reason for the higher death rate is that an acute pulmonary embolism may be more difficult to detect, as the patient may not always show specific signs and symptoms for an embolism (Goldhaber, MD, 2012, p. 236). By doing further research on this topic, the nurse will be able to provide better care for these patients by understanding the diagnosis to all patients who come into the emergency room with a primary or atypical symptom of shortness of breath or an acute pulmonary embolism.

Pulmonary embolism can present itself in many different ways, but it is very important to rule this out, even if vital signs are normal and they have other predisposing factors (Kline, MD, Corrigan, NP, Moss, CRNA, & Zabka, D., 2012, p. 11). There are many factors that a clinician must think about when trying to rule out an acute pulmonary embolism from additional exposure to radiation and prolonged testing that may or may not affect the outcome of the patients care. This will be discussed in the project will provide additional education and resources that will help to make good clinical decision in the future. After further research on this diagnosis and completion of the project, the nurse intends to be able to implement better practice in the future when caring for patients with the possible diagnosis of acute pulmonary embolism.

Signs & Symptoms

❖ Shortness of breath
❖ Chest Pain
❖ Low Pulexmetry
❖ Tachycardia

Diagnosis

There are several test that may be performed in order to rule out an acute PE. There is a blood test, called a D-Dimer, that can be done if the patient has a low risk probability for the diagnosis and if the result is negative, this will rule out an acute PE without being exposed to radiation. It is important to understand that there can be a false-positive on this particular test, as the test are highly sensitive. The test that is preferred by most physicians in the emergency room for any person that is suspected for having a PE is a computed tomography (CT) pulmonary angiography (Feng, MPH, Pines, MD, MBA, MSCE, Jusuf, MD, MPH, & Grosse, PhD, 2013, p. 1034). It is very important for clinicians to follow the pulmonary embolism rule-out criteria (PERC) in order to not have overuse of imaging and cause additional harm to patients with radiation exposure while trying to diagnose them, it is also important to have good clinical judgment while ruling other things out as well, such as acute coronary syndrome, pneumonia, or myocardial infarction (Raja, MD, et al., 2015).

Pathophysiologic Processes

The significance of a pulmonary embolism can have cascade effect once it has occurred. Once the PE occurs, there is pulmonary vascular resistance, which occurs secondary to a blood clot that is caused by the PE. The cascade effect from the PE continues, as the vascular resistance then causes pulmonary hypertension; which can then lead a strain on the right ventricle. The strain on the right ventricles then leads to right ventricular hypertrophy and dysfunction. The body then activates compensatory mechanisms to attempt with activating the sympathetic nervous system to help restore cardiac output (Banen, 2012).

In general, most PE’s will occur from a DVT in the lower extremity area that form and can travel to the pulmonary location. The clot would then lodge itself into the pulmonary arteries, where it would then occlude the artery or surrounding vessels.

It is important to understand that a PE is not a disease, rather an underlying condition from a DVT. There are studies that have proven that a PE can be a result of an unknown process and may not originate from extremes. PE’s are also found in patients that help with a hypercoagulable disorder; which allows the body to make blood clots easily. If a patient has a severe chest injury with an increase in inflammation in the chest, this will also allow for an opportunity for PE to occur (Benns, Reilly, & Kim, 2014). PE’s can also occur as a life-threatening complication of surgery, when the patient has cardiogenic shock, the mortality rate is greater than 50% (Barberol, et al., 2019).