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Atypical presentation of pulmonary embolism: A case report

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Abstract---In spite of high incidence of pulmonary embolism (PE), its diagnosis can be challenging due to vagaries of symptoms. Conversely, right shoulder pain is a relatively easy clinical presentation which is mostly musculoskeletal in nature. But right shoulder pain only in a case of PE, has proven to be a difficult correlation to make. We here describe a patient with no prior history of DVT or PE, no history of prolonged bed rest or recent surgery but admitted to emergency department with right shoulder pain for two days. CTPA revealed pulmonary thromboembolism. Her symptoms improved with subcutaneous Clexane followed by Rivaroxaban oral therapy.

Keywords---pulmonary embolism, shoulder pain, musculoskeletal.

Introduction

Pulmonary embolism (PE) occurs when there is a disruption to the flow of blood in the pulmonary artery or its branches by a thrombus that originated somewhere else. In deep vein thrombosis (DVT), a thrombus develops within the deep veins, most commonly in the lower extremities. PE usually occurs when a part of this thrombus breaks off and enters the pulmonary circulation. Very rarely, PE can occur from the embolization of other materials into the pulmonary circulation such as air, fat, or tumor cells. The spectrum of PE and DVT combined is referred to as venous thromboembolism (VTE) (1).

A timely diagnosis of a pulmonary embolism (PE) is crucial because of the high associated mortality and morbidity, which may be prevented with early treatment. It is important to note that 30% of untreated patients with pulmonary embolism die, while only 8% die after timely therapy. Unfortunately, the diagnosis of PE can be difficult due to the wide variety of nonspecific clinical signs and symptoms in patients with acute PE (2).

The most common symptoms of PE include the following: dyspnea, pleuritic chest pain, cough, hemoptysis, presyncope, or syncope. Dyspnea may be acute and severe in central PE, whereas it is often mild and transient in small peripheral PE. In patients with preexisting heart failure or pulmonary disease, worsening dyspnea may be the only symptom. Chest pain is a frequent symptom and is

usually caused by pleural irritation due to distal emboli causing pulmonary infarction. In central PE, chest pain may be from underlying right ventricular (RV) ischemia and needs to be differentiated from an acute coronary syndrome or aortic dissection **(3)**.

Less common presentations include arrhythmias (e.g., atrial fibrillation), syncope, and hemodynamic collapse. Hemodynamic instability is a rare but essential form of clinical presentation, as it indicates central or extensive PE with severely reduced hemodynamic reserve. Syncope may occur and may be associated with a higher prevalence of hemodynamic instability and RV dysfunction. It is essential to recognize that patients with large PE may, at times, be asymptomatic or have mild symptoms. Many times, PE may be asymptomatic or discovered incidentally during diagnostic workup for another disease **(4)**.

Another symptom that some patients experience is shoulder pain. While this symptom isn't very common, it is important to know about since it's easy to recognize. Pulmonary embolism shoulder pain generally a sharp pain that can start near the neck, upper arm, or upper back. This pain can be typical of a blood clot.

Visceral pain is characterized by being poorly localized and is usually described as deep, squeezing, or colicky. It is mediated by discrete nociceptors in the cardiovascular, respiratory, gastrointestinal, and genitourinary system. On the other hand, somatic pain is characterized as well localized, intermittent, or constant, and is described as aching, throbbing, or cramping. It arises in somatic structures, such as skin, tissue, and muscle. Frequently, visceral pain is perceived as pain arising from somatic sites. Clinicians term this type of pain as "referred pain" **(5)**.

They suggested that visceral and somatic afferents converge onto common dorsal horn neurons; subsequent activation of nociceptors in the viscera results in the perception of pain arising from a somatic source. Although sometimes referred pain causes confusion for clinicians to locate the exact source of pain, the understanding of referred pain can be helpful in diagnosing visceral pathologies. For example, the knowledge that shoulder pain can be a sign of ischemic heart disease can prevent the misdiagnosis of heart disease as having a shoulder problem. Therefore, understanding and awareness of referred pain are necessary for the accurate diagnosis of the pain source **(6)**. Here a patient who had referred pain at the right side from neck to shoulder as a presentation of pulmonary embolism (PE) is reported.

Case presentation

A 38 year old Lebanese lady presented to ED with right shoulder pain for last two days. She was being treated in other facility as shoulder sprain and subsequently as a case of LRTI. She was on oral contraceptive pill regularly. No prior history of DVT or PE, no history of prolonged bed rest or recent surgery. She was hemodynamically stable at presentation without any tachypnea with normal SPO2. Blood tests revealed normal total count, mild rise in CRP 8 mg/L (normal up to 6), normal Creatinine and Raised D dimer.

ECG showed sinus rhythm, no tachycardia (92/min).CXR showed bilateral increased bronchovascular markings.

CTPA revealed pulmonary thromboembolism in anterior basal segmental branch of pulmonary artery resulting in infarction of anterior basal segment of right lower lobe of lung. Subsequent Duplex ultrasound of lower extremity did not reveal any venous thrombosis. Echocardiography was normal including normal right heart function. She was treated with subcutaneous Clexane followed by Rivaroxaban oral therapy which resulted in improvement of her symptoms.

Discussion

The current case reports a patient who complained of right shoulder pain, which seems to be referred pain from PE. First, we thought that the patient's pain was neuropathic pain or musculoskeletal pain, such as myofascial pain syndrome, rotator cuff syndrome, or cervical facet joint syndrome. The pain was completely relieved after the treatment of the PE with improvement of symptoms. Considering the responses to the treatment and the clinical symptoms, the patient's pain on the right side from the neck to shoulder was referred pain from PE in the right lower lobe pulmonary artery.

Referred pain is the pain perceived at a location adjacent to or a distance from the location of origin. Although the mechanism of referred pain has not been elucidated, the most acceptable theory is the convergence-projection theory. It states that multiple nerves converge into a single shared neural pathway; hence, the central nervous system is unable to differentiate the origin of pain (5).

PE is the potentially life-threatening condition causing morbidity and mortality in patients with acute SCI. Venous stasis and alterations of various regulatory proteins following paralysis increase the incidence of thromboembolic disorders, DVT, and PE (7). The symptoms from PE can be easily misjudged as the symptoms from weakness of respiratory muscles, orthostatic hypotension, or neuropathic pain.

Our patient did not receive prophylactic treatment for DVT and PE. Previously, some studies reported referred pain along with the dermatome from the upper cervical levels induced by lung diseases (van der Bruggen et al., 2015). Van der Bruggen et al, (2015) reported a patient with referred pain in the bilateral shoulder areas following a large central tumor in the right lung. The authors of aforementioned studies suggest that the patient's referred pain was induced by diaphragmatic irritation transmitted via the right C4 sensory nerves in the phrenic nerve, which shares the same dermatome as the shoulder area.

In this study, the patient had referred pain in the right shoulder, which seemed to have been induced by PE; the pain was dramatically reduced after the treatment of PE. This case study shows that pain at the right shoulder can occur following unexpected causes such as PE.

Conclusions

In our case, the cause of shoulder pain was referred pain from the infarcted lung due to underlying PE. So, Physicians must be vigilant as this uncommon symptoms may be a forgotten sign of underlying PE which can be life threatening.

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