Case Report

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Paradoxical Embolism: Presented as Recurrent Seizure and Life-Threatening Limb Ischemia

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Abstract

Pulmonary embolism has a large spectrum of clinical presentations ranging from asymptomatic to sudden death. Sometimes presentation of pulmonary embolism is not classical and rather atypical, like paradoxical embolism. We are presenting a case of pulmonary embolism leading to paradoxical embolism (PDE) presented with seizure disorder due to ischemic stroke and acute life-threatening limb ischemia. In this clinical scenario, early suspicion is very important for prompt therapeutic interventions. This patient was diagnosed timely and managed successfully.

Keywords: Ischemic stroke; Limb ischemia; Paradoxical embolism; Seizure disorder; Trans-esophageal echocardiography.

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Introduction

Acute pulmonary embolism causes sudden rise in right ventricular pressure leading to pulmonary hypertension. Paradoxical Embolism (PDE) occurs when venous embolic material passes through an intracardiac communication with right-to-left shunt, becoming a systemic arterial embolism. Paradoxical emboli are considered rare events, estimated to represent 2% of arterial emboli.[1] However, this condition can have catastrophic outcomes, with a reported early mortality rate of 21%.[2] This case report describes a 43-year-old man who presented to the Emergency Department (ED) with recurrent seizure and altered sensorium. On investigation he had pulmonary embolism, ischemic stroke, acute peripheral arterial embolism leading to leg ischemia and deep venous thrombosis. Further investigation revealed a small atrial septal defect, which was the cause of PDE.

Case Report

A 43 years old male presented to emergency department with complaint of respiratory discomfort, chest pain and abnormal behavior for last 3-4 hours. Before coming to the hospital, he was treated by general physician by symptomatic treatment and was referred to hospital as consciousness was deteriorating and he was having repeated episodes of seizures. At the time of hospitalization, patient was disoriented, not following command but there were no localizing signs. On examination his HR 122/mt, BP 116/68 mmHg, SpO_2 90% at room air, RR was 32 per minute, chest was clear. There was no significant clinical finding in other systemic examination. After symptomatic treatment in form of oxygen therapy and intravenous access patient was transferred for CT scan brain as the symptom was predominately confined to CNS. CT scan brain revealed acute ischemic changes in right occipital area. Fig. 1

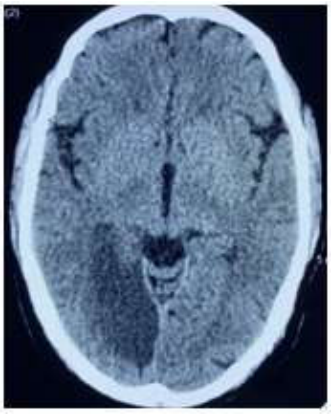

Fig. 1: CT scan brain showing ischemic infarct in right occipital lobe.

Treatment for ischemic stroke started according to protocol but his respiratory distress and degree of hypoxia was unexplained. On further evaluation chest X-RAY was done which was normal, ABG revealed hypoxia with respiratory alkalosis. Trans-thoracic 2D-Echo cardiography revealed right ventricular enlargement and significant pulmonary hypertension with normal LVEF 60%. Lower limb examination did not reveal any significant finding but venous Doppler showed the changes of acute DVT in femoral and popliteal veins in left lower limb. Patient was immediately subjected to CT pulmonary angiography which confirmed pulmonary embolism in both pulmonary arteries (Fig. 2). He was planned for anticoagulation therapy and transferred to high dependency unit but suddenly he complained of severe excruciating pain with coldness and pallor in right lower limb suggestive of compromised arterial circulation. Examination of the affected lower limb revealed coldness, pallor and absence of popliteal, dorsalis pedis and posterior tibial pulses with restricted movement of toes (Fig. 3). Immediately CT Angiography of both lower limbs was done which revealed cut-off at distal part of right common femoral artery with very faint distal collateral circulation, suggesting arterial thromboembolism (Fig. 4).

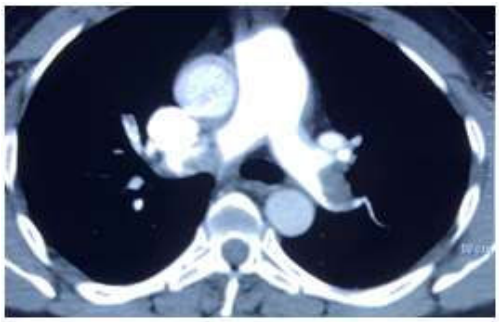

Fig. 2: CT pulmonary angiography showing large thrombus in right and left pulmonary arteries.

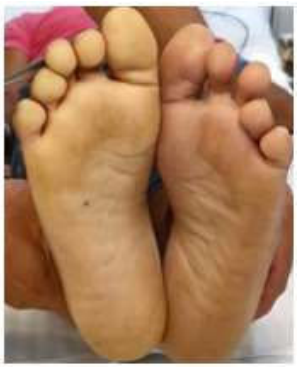

Fig. 3: Picture is showing compromized circulation in right lower limb.

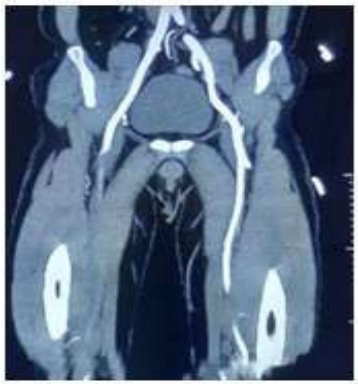

Fig. 4: CT Angiography of both lower limbs revealing cut-off at distal part of right common femoral artery suggestive of thrombus in the artery.

Patient was referred to cardiovascular surgeon and successful emergency thromboembolectomy was performed (Fig. 5). Patient had dramatic relief after surgery with relief of pain and complete neurologic recovery with palpable distal pulses in the affected limb. Postoperatively patient was put on unfractionated heparin therapy according to protocol. He showed good improvement within 24 hours. Once the patient was stable Trans-esophageal Echocardiography (TEE) was done, which revealed small atrial septal defect. After 4 days of therapy patient was discharged on oral anticoagulants.

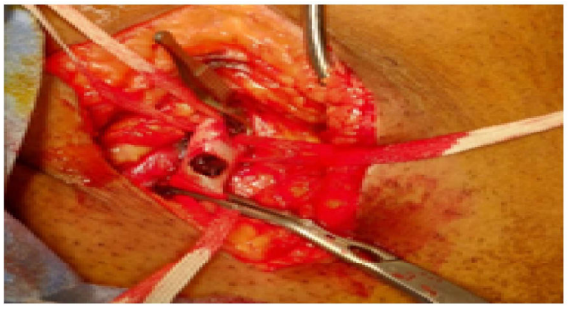

Fig. 5: Per-operative picture of femoral artery embolectomy.

Discussion

Pulmonary embolism is always an underdiagnozed condition due to large spectrum of clinical presentations. A focused examination in the clinical setting of suspected pulmonary embolism should include examination of the lower extremity vasculature including pulses, color and capillary refill. Clinician can diagnose PDE if he is having strong suspicion. The early physical findings of acute arterial occlusion may be easily missed. If PDE is suspected, arterial and venous ultrasound of the lower extremities will expedite the diagnosis. In this case failure to recognize PDE may be potentially disastrous, leaving patients at risk of limb ischemia, amputation and potentially lethal future embolic events across an unrecognized ASD; therefore, when PDE is suspected, anticoagulation alone is inadequate and emergent surgical consultation is indicated. In this case, immediate diagnosis was crucial to the initiation of therapy and surgical intervention to salvage this patient's leg.

Adults may have congenital cardiac anomalies and clotting disorders that go unrecognized for decades, and then suffer acute life-threatening complications. Many patients with asymptomatic ASD can present with PDE during the episode of acute pulmonary embolism. Transthoracic echocardiography may be unrevealing, trans-esophageal echocardiography is more sensitive in detecting occult intracardiac defects, and may be preferable in suspected cases of PDE.

The clinical signs of PDE are often subtle and easily overlooked; its recognition depends mainly on clinical awareness.[3] Presumptive diagnosis is based on the clinical triad of 1) systemic arterial embolism in the absence of left-sided cardiac or proximal arterial source, 2) venous thromboembolism (DVT or pulmonary embolism), and 3) an intracardiac defect with right-to-left shunting.[4] The definitive diagnosis is made at autopsy, or when thrombus is seen crossing a right-to-left shunt in the face of an arterial embolus. Contrast transthoracic or transesophageal echocardiography during and after provocative manoeuvres, such as Valsalva or cough, have been recommended to definitively diagnose PDE.[5] The superiority of transesophageal echocardiography in diagnosis of cardiac defect is proved by various study. Transesophageal echocardiography is 100% sensitive, 92% specific and 97% accurate, and transthoracic echocardiography is 63% sensitive, 100% specific and 78% accurate.[6] Several intracardiac defects have been associated with PDE. The most common, patent foramen ovale, occurs in up to 27.3% of the general population.[7] PDE occur when right atrial pressures increase and exceed left atrial pressures, right-to left shunting occurs. Pulmonary embolism causes acute right atrial pressure elevation, and has been identified in at least 60% of diagnozed PDE.[8]

The optimal management of PDE remains controversial. Most authors agree that systemic anticoagulation should be initiated immediately on the diagnosis of arterial emboli, unless there are major contraindications. Surgical interventions are always life saving in subset of patient of arterial thrombosis. Thrombolytic therapy is advised for the management of hemodynamically significant pulmonary embolism, and intraarterial thrombolysis or surgical embolectomy should be considered in the treatment of life-threatening limb ischemia.

Conclusion

Paradoxical Embolism (PDE) due to massive pulmonary embolism is a rare but clinically important condition, and it should be suspected whenever there is unexplained arterial insufficiency in any organ of body. This is important in a young patient when there is no preexisting cardio-respiratory disease. Timely detection of this clinical entity will provide a window of opportunity to the patient for optimal treatment and also prevent irreversible damage.

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