

Seizures as Initial Presentation in a Patient with Post Traumatic Massive Pulmonary Embolism - A Rare Case Report

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ABSTRACT

Trauma-induced pulmonary thromboembolism is the second leading cause of death in severe trauma patients.¹ Acute pulmonary embolism is a critical and sometimes fatal event that is difficult for clinicians to diagnose because of its wide variety of initial manifestations. The incidence of massive pulmonary embolism presenting as a seizure is <1%, but when it presents as a seizure the mortality is quite high. Hence, timely diagnosis and multidisciplinary approach in identifying and management of these cases can be lifesaving. We describe a rare presentation of a 40-year-old male with mild traumatic brain injury and pan facial fractures, who underwent surgical fixation for the same and developed seizures on post-operative day 11, despite being on thromboprophylaxis, was diagnosed to have Massive Pulmonary Thromboembolism and managed with emergency Pulmonary thromboembolismectomy with excellent post operative results.

Keywords: massive pulmonary thromboembolism, seizures, post traumatic pulmonary embolism

INTRODUCTION

Venous thromboembolism (VTE) remains a major challenge in critically ill patients. Subjects admitted to the Intensive Care Unit (ICU), in particular, trauma patients, are at a high risk for both deep vein thrombosis (DVT) and pulmonary embolism (PE). Pulmonary embolism is a cardiovascular emergency. Occluding the pulmonary arterial bed may lead to an acute life-threatening condition, due to a potentially reversible right ventricular failure. Performing an early clinical diagnosis of MPE is challenging as there is a spectrum of phenotypes. Group 1 includes patients with tachycardia and tachypnea and those with the greatest risk of death (7.4%) and major

bleeding (7.0%). Group 2 includes patients of younger age and those with no complications (mortality 1.4%; major bleed 1.6%). Group 3 includes older women, with a history of hypertensive and cerebrovascular disease (mortality 2.3%; major bleed 1.3%). Group 4 includes patients with recent surgery, trauma, and malignancy (mortality 2.5%; major bleed 1.9%).² Seizure commonly presents in emergency departments (EDs). However, the incidence of MPE presenting as a seizure is <1%, but when it presents as a seizure, the reported mortality rate is 54.5%.³ In this report, we describe the case of a patient who presented with two episodes of seizures on the postoperative

day 11 following a polytrauma. After a detailed clinical evaluation and computed tomography pulmonary angiogram (CTPA), the patient was diagnosed with bilateral massive pulmonary embolism and was successfully treated with emergency mechanical pulmonary thromboembolism.

CASE REPORT

A 40-year-old male patient was brought to the Emergency room with alleged history of Road traffic accident. Mechanism of Injury was described as patient was an unhelmeted two-wheeler rider, had a high velocity sudden deceleration injury. On arrival primary survey, patient's airway was patent, hemodynamically stable in a conscious oriented state with a Glasgow coma scale of 15. On examination, patient had Bilateral periorbital ecchymosis and multiple abrasions with swelling of the entire face. CT Brain on arrival was done suggestive of extradural haemorrhage in the convexity of left frontal bone, subarachnoid haemorrhage in the right fronto-temporo-parieto-occipital regions with midline shift of 3mm and multiple comminuted displaced cranial fractures (Figure – 1) Patient was initiated on antiepileptic and antibiotic therapy for conservative management of extradural haemorrhage. On day 2 of admission, the patient underwent open reduction with internal fixation under general anaesthesia for pan facial fractures, following which patient was shifted to ICU and then shifted to the ward in a hemodynamically stable condition.

On post operative Day 11, patient had two episodes of witnessed generalized tonic clonic seizures in the ward which aborted after Intravenous Benzodiazepines. On examination, his heart rate – 128 beats per minute, BP:84/54 mmHg, RR:32 cycles per minute, GCS E4V3M5 = 12/15. Systemic examination was otherwise unremarkable. Repeat

CT brain was suggestive of - reduction in extradural and subarachnoid haemorrhage in comparison to previous study with no fresh pathology. (Figure 2)

ECG – Sinus tachycardia.

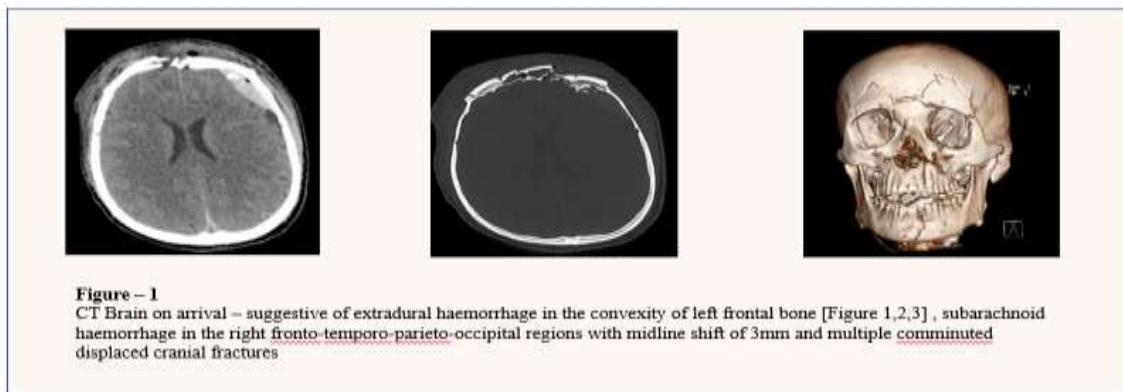
2D echocardiography – Dilated right atria and dilated right ventricle, with mild RV dysfunction, TAPSE 1.3cm with plethoric IVC. (Figure 3)

CT Pulmonary Angiography was done which revealed

- 70% luminal narrowing involving the right main pulmonary artery with
- 90% luminal narrowing of the left main pulmonary artery

suggestive of pulmonary thromboembolism. (Figure – 4)

The patient was diagnosed to have Massive Pulmonary Thromboembolism. Since there was an absolute contraindication for thrombolysis, he was immediately taken up for mechanical pulmonary thromboembolism by CTVS team. Intra-operative findings of multiple thrombi were found (Figure – 5). Post-operative patient's status was uneventful and was discharged with oral anticoagulants in a hemodynamically stable condition.



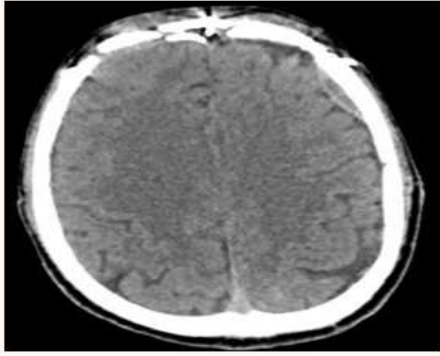


Figure 2 – CT Brain post seizure episode - reduction in extradural and subarachnoid haemorrhage in comparison to previous study with no fresh pathology



Figure 3 – 2d echo - Dilated right atria and dilated right ventricle, with mild RV dysfunction, TAPSE 1.3cm with plethoric IVC.



Figure 4 – CT Pulmonary Angiography – Features suggestive of extensive filling defect in both pulmonary arteries and branches. 70% luminal narrowing involving the right main pulmonary artery and 90% luminal narrowing of the left main pulmonary artery

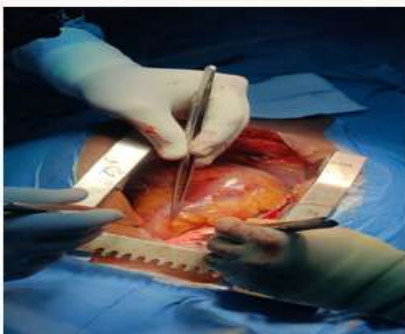


Figure 5 – Intraoperative Findings – Pulmonary Thrombolectomy

DISCUSSION

Pulmonary embolism (PE), a type of venous thromboembolism (VTE), is a life-threatening emergency. High morbidity and mortality are associated with this condition.

Massive Pulmonary embolism is a severe, acute form of Pulmonary embolism with hemodynamic compromise, including refractory hypotension, pulselessness, or persistent profound bradycardia, resulting in

mortality rates as high as 25 to 65% in the absence of an early diagnosis and timely intervention.⁴ Seizures are common clinical neurological manifestations of various pathologies. They have been noted in cardiopulmonary diseases such as long QT syndrome, severe bradycardia, systemic hypertension, aortic dissection, and cardiac arrest. However, new-onset seizure as the clinical presentation of MPE has rarely been reported; thus, recognition is more difficult, timely management is delayed, and consequently, it has a much higher risk of death and poor outcomes.³

Seizures in the setting of pulmonary embolism can be the result of two possible mechanisms.

1. Greater than 50% occlusion of the pulmonary vascular tree causes right ventricular failure and impaired left ventricular filling, leading to a reduction in cardiac output, arterial hypotension, reduced cerebral blood flow, and ultimately seizures.
2. Hypoxemia secondary to ventilation perfusion mismatch may also play an important role in the development of seizure

Considering that no specific recommendations have been provided for the diagnostic work-up of patients presenting with seizure as the first symptom of acute PE, only generic suggestion can be proposed. A complete blood count, brain imaging and EEG, must be obtained as early as possible. With the development of imaging and treatment, early diagnosis and severity assessment of acute PE should be highly feasible in the ED. The pathognomonic S1Q3T3 pattern on the ECG supposedly suggests that PE, was observed in only a third of patients with pulmonary thromboembolism. Most patients showed only sinus tachycardia. In our case, the patient's ECG showed sinus tachycardia. 2d echocardiography generally has dilation of the right ventricle and/or the right atrium. CT Pulmonary angiography, is highly sensitive (83%), specific (96%), and

less invasive, is the first-line investigation for high-risk PE.³

In the presence of conventional risk factors for VTE, the diagnostic work-up for acute Pulmonary embolism must be performed requiring the support of a cardiologist or internist to cooperate in the patient's management. Specifically, the suspicion of acute PE must be based either on clinical or anamnestic findings as well as on the validated predictive scores.⁶ (WELL's SCORE (Figure -6) for Pulmonary Thromboembolism in our patient – 6, suggestive of high probability for PE) Active brain bleeding, as potential triggers of the seizure activity, must be ruled out before starting anticoagulation or any reperfusion treatments.

Anticoagulation with unfractionated heparin, LMWH, or warfarin is regarded as the standard of care for all VTEs. Thrombolytics (e.g., rtPA), particularly emergency thrombolysis (within 48 h of symptom onset), is the most effective therapy for the treatment of PE, particularly in high-risk patients and patients whose condition deteriorated while receiving anticoagulation.⁵

Percutaneous catheter-directed treatment (CDT) and surgical embolectomy are considered alternatives to systemic thrombolysis in patients with hemodynamic instability, refractory hypoxia, shock, cardiac arrest, or in patients whom thrombolysis is contraindicated. Very few isolated reports over the latest years have described the occurrence of seizures as the first manifestation of acute pulmonary embolism (PE).

As well known, the diagnosis of acute PE is often challenging because the clinical presentation can mimic the characteristics of several diseases, leading to a painstakingly long time in diagnosis and initiating treatment.

Zuin et al conducted a literature review to analyze the clinical characteristics of patients with acute pulmonary embolism (PE) in which seizures were the first clinical manifestation of the disease. After screening

258 articles in PubMed, Scopus, Cochrane Library, and Google Scholar databases, they identified 16 case reports meeting the inclusion criteria. In our review of the literature, only two patients were treated surgically, and both survived the condition.² We report the third case, to our knowledge,

of a patient with massive pulmonary embolism being treated with surgical thromboembolectomy. The early diagnosis of PE poses a challenge to clinicians. A high clinical suspicion remains the cornerstone of timely diagnosis and treatment.

Wells Score

Algorithm:

| Predictor | Score |
|----------------------------------------------------------------------------------------------------|--------------|
| Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpation of deep veins) | +3 |
| An alternative diagnosis is less likely than PE | +3 |
| Heart rate greater than 100 | +1.5 |
| Immobilisation at least 3 days or surgery in previous 4 weeks | +1.5 |
| Previous DVT/PE | +1.5 |
| Haemoptysis | +1 |
| Malignancy | +1 |
| Total | /12.5 |

| Risk of PE | Associated Score |
|---------------------|------------------|
| Low (3% risk of PE) | <2 |
| Moderate (28%) | 2-6 |
| High (78%) | >6 |

| Risk of PE | Associated Score |
|--------------------------------|------------------|
| Unlikely (5.1-7.8% rate of PE) | ≤4 |
| Likely (~40%) | >4 |

Figure – 6 WELLS score for Pulmonary embolism

CONCLUSION

Pulmonary embolism (PE) is not rare, with an overall annual incidence of 60 to 70 cases per 100 000.

Pulmonary embolism presents typically with cardiopulmonary symptoms. In some cases, however, patients presenting with neurologic symptoms such as syncope and a convulsion are quite rare, making clinical evaluation extremely challenging, often resulting in delayed diagnosis & management. Very few isolated reports over the latest years have described the occurrence of seizures as the first manifestation of acute pulmonary embolism (PE). As well known, the diagnosis of acute PE is often challenging because the clinical presentation can mimic the characteristics of several diseases, leading to a painstakingly

long time in diagnosis and initiating treatment. Vigilant clinical evaluation and meticulous diagnostic workup is the cornerstone in making timely diagnosis of pulmonary embolism and choosing the optimal treatment modality can yield exceptionally good patient outcome.

Declaration by Authors

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