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Case Report

Internal Medicine Section

Thrombolytic Management of Submassive Pulmonary Embolism along with Deep Vein Thrombosis: A Case Report

VIJAYASHREE S GOKHALE[1], ATHARVAN SHARMA MANGALAPALLI[2], HEMANJALI AVUTHU[3]

ABSTRACT

Pulmonary Embolism (PE) is a life-threatening condition, often presenting with classic symptoms such as dyspnea, chest pain, and tachycardia. However, atypical presentations can obscure early recognition, particularly in intermediate-risk, submassive PE and clots in transit. The present report describes a case of a 50-year-old male automobile mechanic with uncontrolled diabetes who presented with giddiness for one week, followed by acute onset breathlessness. Clinical evaluation revealed tachycardia, tachypnea, left leg swelling, and hypoxaemia. Electrocardiography (ECG) showed Right Ventricular (RV) strain with S1Q3T3 pattern. Echocardiography revealed RV dysfunction with a Tricuspid Annular Plane Systolic Excursion (TAPSE) of 15 mm. Computed Tomography Pulmonary Angiography (CTPA) demonstrated a large saddle embolus with extension into bilateral lobar and segmental branches. The patient was thrombolysed with streptokinase, followed by an infusion of unfractionated heparin before being started on oral anticoagulants. On day four after thrombolysis, biomarkers improved significantly; CTPA showed complete resolution with marked improvement of RV dysfunction on echocardiography. The present case emphasises the importance of maintaining a high index of suspicion for PE in atypical presentations and demonstrates successful thrombolysis in an intermediate-high risk case, even with older, cost-effective agents.

Keywords: Dizziness, Echocardiography, Mortality, Streptokinase, Troponin

CASE REPORT

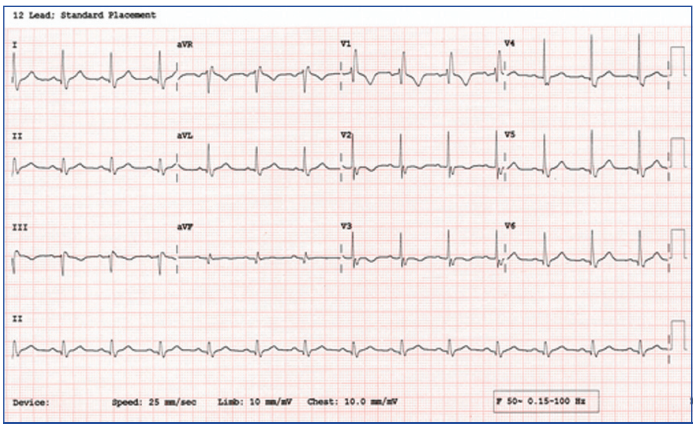
A 50-year-old male automobile mechanic by occupation presented with giddiness for one week, described as lightheadedness and a floating sensation without vertigo or blackouts. The symptoms were worsened by standing or physical exertion. He also developed acute onset dyspnea on exertion {Modified Medical Research Council (mMRC) Grade II} [1], which rapidly progressed to dyspnea at rest (mMRC Grade IV) on the day of presentation. He had no cough, chest pain, palpitations, or wheeze. The patient also had one episode of low-grade fever, multiple episodes of non-bilious vomiting, and an irritant dry cough on the day of presentation. He had a past medical history of type 2 diabetes mellitus for six years, on metformin 500 mg once daily.

On full physical examination, he was haemodynamically stable (blood pressure 140/70 mmHg) and had tachycardia (pulse rate 126/min), tachypnea (respiratory rate 32/min), and hypoxaemia (72% on room air) with no murmurs or adventitious sounds on auscultation. He was found to have unilateral left-leg oedema with calf tenderness, with a history of blunt-force trauma in a vehicular accident two months prior. He had no history of immobilisation, surgery, or long-distance travel. He had no other risk factors apart from habitual tobacco chewing.

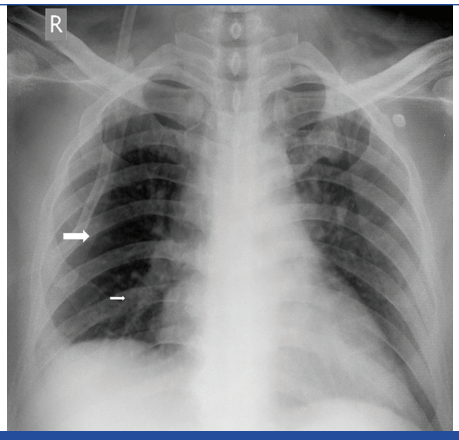
Well's pretest probability score [2] was 7.5 (high clinical probability), Revised Geneva Score [2] was 12 points (>60% probability). Differential diagnoses included silent myocardial infarction, heart failure, and atypical pneumonia.

Laboratory investigations showed haemoglobin 13.4 g/dL, total leukocyte count 16,500/µL, platelets 170,000/µL; other routine investigations were within normal limits. Random blood glucose was 340 mg/dL, with no acidosis or ketonuria. D-dimer was 9648 ng/mL on admission; troponin I 120.5 pg/L; N-terminal pro-B-type natriuretic peptide (NT-proBNP) 2477 pg/mL. Electrocardiography revealed left axis deviation, right bundle branch block, and RV strain with the classic S1Q3T3 pattern [Table/Fig-1]. Chest X-ray showed regional oligaemia in the right lung field with a prominent right descending pulmonary artery [Table/Fig-2]. Two-dimensional echocardiography demonstrated normal Left Ventricular (LV) systolic function, dilated right atrium and ventricle, RV dysfunction with a bulging interventricular septum, moderate tricuspid regurgitation, estimated RV Systolic Pressure (RVSP) of 48 mmHg, and a TAPSE of 15 mm. Lower-limb compression ultrasonography revealed thrombosis of the left superficial femoral, popliteal, and posterior tibial veins. CTPA revealed an extensive saddle PE at the bifurcation of the main pulmonary artery with extension into the right and left lobar and segmental branches, causing near-complete opacification with wedge-shaped areas of lung infarction in the left upper and lower lobes [Table/Fig-3]. PE Severity Index (PESI) score [2] was 120, indicating a risk class IV with a predicted 30 day Mortality risk of 4-11%. Simplified (sPESI) score [3] was 2, indicating an elevated risk of mortality.

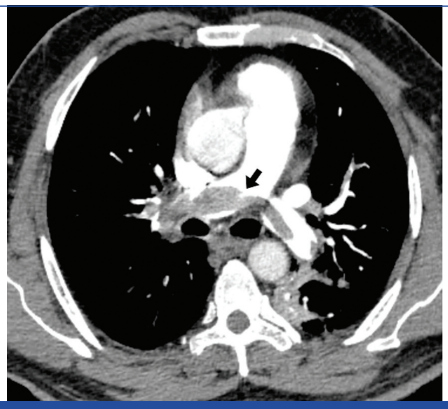
A diagnosis of submassive, intermediate-high-risk PE (ESC 2019) was made, and the decision to administer thrombolysis was taken. Streptokinase was started at 2.5 lakh units over 30 minutes, followed by 100,000 U/hour for 24 hours, followed by unfractionated heparin 5,000 U Intravenously (IV) every 6 hours [4]. The patient



[Table/Fig-1]: ECG showing Left Axis Deviation (LAD) with Right Bundle Branch Block (RBBB) with RV strain pattern with S1Q3T3 pattern in limb leads.

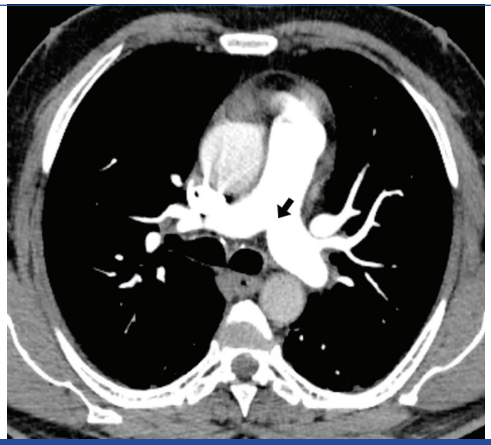


[Table/Fig-2]: Chest X-ray showing regional oligaemia in the right lung field with a prominent right descending pulmonary artery.



[Table/Fig-3]: CTPA showing extensive saddle PE at the bifurcation of main pulmonary artery with extension into right and left lobar and segmental branches.

remained haemodynamically stable throughout thrombolysis and thereafter, and was assessed periodically for signs of neurological deficits, ecchymoses, and gastrointestinal bleeding. The patient showed marked clinical improvement in the first few days. On day 4, cardiac biomarkers improved (troponin I <10 µg/L; proBNP 221.9 pg/mL). Repeat CTPA showed complete radiological resolution of the thrombus [Table/Fig-4], and echocardiography showed normal right ventricular function, with an RVSP of 26 mmHg and a TAPSE of 22 mm. Repeat Compression Ultrasonography (CUS) showed complete resolution of Deep Vein Thrombosis (DVT). The patient was started on rivaroxaban tablets and oral hypoglycemic agents and was discharged on the same day. A comprehensive thrombophilia and autoimmune workup, including Antinuclear Antibody (ANA), Antineutrophil Cytoplasmic Antibody (ANCA), and Antiphospholipid Antibody (APLA) profiles, as well as protein C, protein S, antithrombin III levels, and homocysteine, was normal. However, genetic testing for Factor V Leiden mutation, prothrombin G20210A mutation, and Methylenetetrahydrofolate Reductase (MTHFR) mutation was not performed. The patient recovered completely and is under regular follow-up. Informed consent was obtained from the patient for publication of this case report and accompanying images.



[Table/Fig-4]: Repeat CTPA on Day 4 showing complete resolution of the clot.

DISCUSSION

Often quoted as the great masquerader, a plethora of atypical presentations of PE often leads to inaccurate or delayed diagnosis. The classic picture of dyspnea, pleuritic chest pain, dry cough, and haemoptysis is uncommon. Atypical features range from dizziness, lightheadedness, hiccups, epigastric pain, bradycardia, loss of consciousness, syncope, seizures, fever, heart failure, and shock. A significant number of patients are asymptomatic, and diagnosis is often incidental or occurs with a high index of suspicion [5,6]. Many scoring systems have been developed and studied for clinical diagnosis {Wells score, revised Geneva, and Pulmonary Embolism Rule-out Criteria (PERC)}, risk stratification, and prognostication of PE {Pulmonary Embolism Severity Index (PESI), Pulmonary Embolism Progression Score (PEP), and FAST scores} [3,7]. Emerging tools such as the Bova score and FAST scores are being used to refine intermediate-risk stratification [3]. Newer AI-based models like PE-mind have been developed for accurate prediction of PE risk in acute DVT patients [8]. Submassive or intermediate-risk PE is a heterogeneous group of haemodynamically stable patients with RV dysfunction or elevated cardiac biomarkers. Markers of myocardial injury include high-sensitivity troponins (I and T) and Heart-Type Fatty Acid-Binding Protein (H-FABP). RV dysfunction is determined by elevated natriuretic peptides (BNP and NT-proBNP) along with echocardiographic findings such as a dilated RV, flattening of the interventricular septum, decreased TAPSE, or a reduced peak systolic velocity of the tricuspid annulus on tissue Doppler imaging. An RV/LV diameter ratio ≥1.0 and TAPSE <16 mm indicate a poor prognosis. This group of patients is at risk of impending haemodynamic collapse with further worsening of the thromboembolism. The patient falls into the intermediate-high-risk PE category (ESC 2019 criteria) with evidence of both RV dysfunction and myocardial injury [9]. Thrombolysis in such patients remains controversial despite landmark trials such as PEITHO (Meyer G, et al., 2014) and is reserved for patients with haemodynamic instability. The trial showed a significant reduction in RV dysfunction and haemodynamic decompensation but at a markedly increased risk of major bleeding (fivefold) and intracerebral haemorrhage (tenfold) [10]. Recently, Catheter-Directed Thrombolytic therapies (CDT) and mechanical thrombectomy have emerged as safer alternatives to systemic thrombolysis. A meta-analysis of CDTs demonstrated faster clot resolution, a lower risk of bleeding, and lower in-hospital mortality [11]. The PEERLESS trial, a multicentre Randomised Controlled Trial (RCT), demonstrated the benefits of Large-Bore Mechanical Thrombectomy (LBMT) in terms of less clinical deterioration and shorter Intensive Care Unit (ICU) stay compared with CDTs (Jaber WA et al., 2025) [12]. The Standard vs. Ultrasound-assisted Catheter Thrombolysis for Sub-massive Pulmonary Embolism (SUNSET) trial (Avgerinos ED et al., 2021) was a pilot study investigating the efficacy and potential superiority of Ultrasound-assisted CDT (US-CDT) in reducing clot burden in intermediate-high-risk patients with RV dysfunction [13]. This is complemented by the Higher-risk Pulmonary Embolism Thrombolysis (HI-PEITHO) trial (Klok FA et al., 2022), an ongoing multicentre RCT assessing the safety of US-CDT for the management of intermediate-high-risk PE compared with anticoagulation alone [14].

Careful patient selection is necessary for systemic thrombolysis, with close monitoring for bleeding complications. Despite the preference for Alteplase for systemic thrombolysis and CDT, streptokinase was used due to financial constraints [9]. Streptokinase is a bacterially derived first-generation thrombolytic (fibrinolytic) agent, which indirectly activates plasminogen to plasmin, resulting in clot degradation [15]. In a prospective cohort study by Seghda TAA et al. (2024), streptokinase was used for systemic thrombolysis in high-risk patients and was associated with significant improvements in clinical

parameters and in right ventricular function, at the cost of a modest increase in the risk of bleeding complications [16]. A meta-analysis by Li HY et al., (2023) covered 29 randomised trials comparing the efficacy of thrombolytic agents, including streptokinase, over anticoagulation with heparin alone and demonstrated the superiority of thrombolysis in reducing mortality. The risk of major bleeding was not significantly different among the five agents, but the risk of minor bleeding was lowest with streptokinase [17]. A similar retrospective case series of 10 high-risk PE patients thrombolysed with streptokinase showed significant clinical and echocardiographic improvement without major bleeding (Yaya BE et al., 2025) [18]. Another case report describes a cancer-associated intermediate-risk PE managed by a combination of mechanical thrombectomy, CDT, and reduced-dose systemic thrombolysis (Oliveira-Mendes S, 2025) [19]. The remarkable aspect of this case was the rapid clinical improvement within three days and a complete resolution of RV dysfunction and the clot on subsequent imaging.

CONCLUSION(S)

The diagnosis of Pulmonary Embolism requires vigilance and a high index of suspicion, especially in atypical presentations masquerading as other aetiologies. Systemic thrombolysis with older agents remains a viable option in resource-limited settings and for patients who cannot afford newer therapies. Intermediate-high-risk PE with a large clot burden can be considered for systemic thrombolysis. Early recognition and aggressive management with careful monitoring can yield favourable results in this subset of patients.

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PARTICULARS OF CONTRIBUTORS:
1. Professor, Department of Internal Medicine, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Maharashtra, India.
2. Resident, Department of Internal Medicine, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Maharashtra, India.
3. Resident, Department of Internal Medicine, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Atharvan Sharma Mangalapalli,
Resident, Department of Internal Medicine, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Maharashtra, India.
E-mail: artemisaug2431@gmail.com

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