An unusual case of acute dyspnea in current smoker: Thinking out of the box.

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Introduction

Pulmonary Embolism,[1] is globally the third most frequent acute cardiovascular syndrome behind myocardial infarction and stroke. In epidemiological studies, annual incidence rates for PE range from 39115 per 100 000 population; for DVT, incidence rates range from 53162 per 100 000 population.[2,3] Cross-sectional data show that the incidence of VTE is almost eight times higher in individuals aged > 80 years than in the fifth decade of life[4]. In parallel, longitudinal studies have revealed a rising tendency in annual PE incidence rates over time. Together with the substantial hospital associated, preventable, and indirect annual expenditures for PE (an estimated total of up to €8.5 billion in the European Union),[5] these data demonstrate the importance of PE and DVT in ageing populations in Europe and other areas of the world. They further suggest that VTE will increasingly pose a burden on health systems worldwide in the years to come.[5-8]. Acute pulmonary embolism is a medical emergency with significant mortality due to a delayed diagnosis. Many of the patients are either asymptomatic or present with typical respiratory symptoms found in other respiratory diseases. Hence a high degree of clinical suspicion is required to suspect and investigate for pulmonary embolism in these patients. Acute pulmonary embolism is usually a complication of deep vein thrombosis but is also seen in patients with hypercoagulable states and in female patients on hormone replacement therapy. The diagnosis of acute pulmonary embolism is missed in more than fifty percent cases and is revealed on autopsy. However, a timely diagnosis is very useful in treating the patient appropriately for pulmonary embolism.

Case presentation

We are presenting a 30 year old male patient. He presented with sudden onset dyspnea and central chest pain since one day along with severe fatigue and dizziness. The dyspnea was of MMRC grade 4 and increased on lying down. The chest pain was severe, stabbing type and non-radiating since 1 day. He was a smoker for the last 6 years with a pack year of 12. On examination his BP was 90/50 mm Hg, respiratory rate- 40/min, pulse rate- 130/min and SpO2- 80%. He had bilateral pedal edema and raised JVP. On Auscultation of chest bilateral vesicular breath sound with bilateral crepts were heard. Cardiac auscultation revealed loud P2 in the pulmonic area. CBC and KFT was normal but LFT showed Total bilirubin- 5.9 mg/dl with direct/indirect bilirubin of 4.5/1.4 mg/dl, SGOT-86 IU/L, SGPT-52 IU/L, ALP-230 IU/L. D-dimer was 385 mg/L and INR was 1.92. 2D- ECHO showed dilated RA/RV with RV dysfunction and severe pulmonary arterial hypertension (RVSP- 82 mm Hg) with LVEF- 55% and no regional wall motion abnormality. Contrast enhanced CT thorax(Fig-1) revealed a filling defect in right main pulmonary artery due to a right sided thrombus along with bilateral pleural effusion.
Treatment

Patient was kept in ICU and started on all supportive treatment like NIV, Inj Torsemide 10mg IV OD, Tab Aspirin plus Clopidogrel 150mg OD and Inj Low Molecular Weight Heparin 0.6ml S/C BD, Tab Ursodeoxycholic acid 300 mg TDS. Patient’s LFT and PT/INR shows improvement but patient was still in respiratory distress. Patient relatives were counselled for benefits and side effects of reteplase and consent for thrombolysis was taken. 2 bolus doses of 10 units of Reteplase intravenous was given at 30 mins apart along with that subcutaneous Low Molecular Weight Heparin 0.6 ml 12 hourly was started after 2nd bolus dose of Reteplase. After 24 hours patient condition improved, there was no respiratory distress patient was weaned from NIV, BP was 110/70 mmHg, patient had no bleeding complications. Patient general condition and vital improved, therefore patient was discharged on room air.

Discussion:

Pulmonary embolism is a disease with an early mortality rate within 30 days of 7% to 11%[9] and majority of these patients have hemodynamic instability at presentation. Thrombolysis is an effective treatment option in these patients as it rapidly dissolves the thrombus and reduces the patient mortality by improving hemodynamics, gas exchange and right sided heart failure in these patients. Various thrombolytic agents have been tried including Streptokinase, Urokinase, Alteplase, and Tenecteplase for treatment of acute pulmonary embolism. The first three agents need to be given as an infusion whereas Tenecteplase can be given as a weight-adjusted bolus. A newer thrombolytic Reteplase has the advantage of bolus administration and does not need weight adjustment thereby further simplifying its usage. Reteplase has been shown to cause greater patency in infarct patients with acute MI than Alteplase. Reteplase has not been used much in patients with acute pulmonary embolism. We hereby report a case of successful management of acute pulmonary embolism with double bolus dose of Reteplase. Theron C et al[10] have also reported successful management of a case of massive pulmonary embolism with similar double bolus dose of Reteplase.

A thrombolytic therapy that leads to a more rapid reduction in pulmonary resistance could lead to faster hemodynamic improvement and potentially greater mortality reduction. A recent case series by Ghobadi et al[11] reported successful thrombolysis of massive (high-risk) pulmonary embolism with the use of Reteplase in 5 patients, with no mortality. In
a study conducted by Nishanth et al[12] double-bolus reteplase given with heparin is effective in the treatment of high- and intermediate-risk pulmonary embolism with minimal risk of bleeding.

Thrombolytic treatment is known to carry a risk of major bleeding, including intracranial hemorrhage. The reported incidence of major bleeding with thrombolytic therapy in pulmonary embolism ranges from 8.1% to 9.9%. In the present study, there was no major bleeding event. Tebbe et al[13] also reported no stroke or intracranial bleeding with the use of Reteplase. Minor bleeding occurred in 7.5% patients, which included bleeding gums, hemoptysis, and worsening of menstrual bleed[14-15].

Reteplase helped in salvaging our patient from the life-threatening acute pulmonary embolism and has been found to be superior to Urokinase for the treatment of acute pulmonary embolism[16]. In another study by Zhang et al[17] Reteplase, a third-generation thrombolytic drug, may reduce myocardial damage more than Urokinase apart from their therapeutic effect in patients with acute pulmonary embolism.

Conclusion

Reteplase can be a good treatment for life-threatening pulmonary embolism patients presenting in a hemodynamically unstable condition since it is easy to administer as a bolus and there is no need for a dosing adjustment according to the weight of the patient. Reteplase not only dissolves the thrombus but also helps in reducing myocardial damage.

References:

1. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS)