

Thrombolytic Therapy in Pulmonary Embolism

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Abstract

Massive pulmonary embolism carries a high mortality. Potential treatment includes anticoagulation, thrombolytic therapy and embolectomy. We report a case of deep vein thrombosis leading to progressive massive pulmonary embolism despite appropriate anticoagulation, where thrombolysis with IVC filter placement resulted in a successful outcome.

Case Report

A 27 years old man was admitted to Cavan Hospital with left leg swelling (d-dimer 9806 ug/ml) following a recent transatlantic flight. Low Molecular Weight Heparin (LMWH) 175mg/kg and warfarin were commenced. Doppler venogram confirmed thrombus in the left posterior tibial vein. On day four the patient developed pleuritic chest pain; CT-Pulmonary Angiogram (CTPA) demonstrated a saddle embolus straddling the bifurcation of posterior branch of right pulmonary artery.

Continuous heparin was infused (APTT >2.5). On day seven he complained of further central chest pain. Vital signs showed pulse 125 bpm, RR 35/minute BP 75/50mm Hg with arterial blood gases as follows pH=7.46, pO₂=5.72kPa, pCO₂=5.51kPa, HCO₃=29mmol, O₂ Sat=83.7%. Urgent CTPA showed a large plug embolus, completely occluding the right main pulmonary artery, with no distal flow. A large embolism straddled the left inferior pulmonary artery (Figure 1). An IVC tulip type removable filter was inserted. The patient was thrombolysed with Alteplase (t-PA) intravenous infusion of 100mg given over 2 hours. Over the next few hours his symptoms and signs settled and O₂ saturations improved to 90%. LMWH (220mg/kg) and warfarin were continued. Recovery was uneventful. CT abdomen and pelvis was normal. On day 16, repeat CTPA showed complete resolution of the embolus in the left inferior pulmonary artery (Figure 2). Significant improvement with the fragmentation of the plug embolus in the right main pulmonary artery was noted. Satisfactory placement of the filter with no evidence of trapped emboli was confirmed by ultrasound. Thrombophilic screen was normal. He was discharged with an outpatient appointment and was advised to continue LMWH and warfarin for two more weeks and then warfarin (INR >3.0) alone. The patient was asymptomatic and made a satisfactory recovery.

Figure 1: Pre-thrombolysis

Figure 2: Post-thrombolysis

Discussion

Pulmonary embolism is a major cause of death (7% - 30% mortality)¹. Patients with PE, raised BNP and Troponin T are at increased risk of hemodynamic instability². Although thrombolytic therapy carries considerable risk³, it is recommended for consideration in patients with massive pulmonary embolus and hemodynamic instability⁴. There is no benefit in thrombolytic therapy in normotensive patients with pulmonary embolus⁵. Thrombolytic therapy has been shown to improve hemodynamic parameters in patients with massive pulmonary embolus but long term benefit remains uncertain⁶. Recent metanalysis of an unselected group of patients with PE has shown no benefit from thrombolytic therapy but numbers remain small and further studies are required⁷. A dose of alteplase 100mg intravenous infusion over two hours has been shown to be most effective⁸ with 50% clot reduction occurring within the first 24 hours⁹. The role of inferior vena caval filters remains while reducing subsequent PEs has no demonstrable effect on overall mortality¹⁰.

Specific guidelines now exist for their use but are considered acceptable treatment in unstable patients¹⁰. Patients who present with massive pulmonary embolus and severe cardio respiratory distress are thankfully rare. It is most probable that treatments will have to be individualised in each case. We present here such a patient in whom a combination of IVC filter insertion and thrombolysis resulted in a successful clinical outcome.

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