

Viscoelastometry-guided low-dose catheter-directed thrombolysis in pulmonary embolism with prohibitive bleeding risk: a two-case series

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Background: Reperfusion of postoperative acute pulmonary embolism (PE) is challenging because systemic thrombolysis carries substantial bleeding risk, while distal thrombus distribution may limit mechanical thrombectomy. Recent randomized trials of local thrombolysis excluded patients at high bleeding risk. We describe two patients treated with low-dose catheter-directed thrombolysis (CDT), monitored by serial viscoelastometry for systemic fibrinolytic effects.

Case 1: A 31-year-old woman developed syncope, dyspnoea and vasopressor-dependent hypotension one day after elective plastic surgery. CT pulmonary angiography confirmed bilateral PE (AHA/ACC E1). Echocardiography revealed right ventricular (RV) dysfunction (TAPSE 12 mm) and D-sign. Given recent surgery and distal thrombus localisation, bilateral pigtail-catheter alteplase infusion commenced without bolus at a combined 0.8 mg/h. Serial ClotPro FIB- and ECA-tests showed no relevant systemic fibrinolysis. After 24 hours (19 mg alteplase), haemodynamics and RV function improved (TAPSE 23 mm). A small haematoma developed during subsequent heparin treatment but regressed. She was discharged on day 10 without residual RV strain.

Case 2: A 56-year-old woman developed syncope and bilateral PE one day after percutaneous nephrolithotomy, with haematuria preceding anticoagulation. Cranial CT angiography following head trauma was negative. NEWS2 was 6, RV/LV ratio 1.0, and the basal and mid RV free wall nearly akinetic. Despite haemodynamic stability (AHA/ACC D1), elevated cardiac biomarkers, TAPSE 9 mm, D-sign and McConnell sign indicated severe RV dysfunction. Bilateral McNamara catheters delivered alteplase at a combined 0.5 mg/h, with serial viscoelastometry guiding treatment duration and dosing. Reperfusion succeeded, RV function recovered, oxygen supplementation ceased and haematuria improved without additional bleeding. She was discharged on day seven.

Conclusion: In two postoperative patients with high- and intermediate-high-risk PE, prolonged low-dose CDT achieved clinical and RV recovery without major bleeding. Serial viscoelastometry may help individualize thrombolysis duration by detecting signs systemic fibrinolysis effects, although prospective validation is needed.