

INTERMEDIATE-HIGH RISK PULMONARY EMBOLISM WITH CLOT IN TRANSIT: WHAT SHOULD BE THE BEST TREATMENT ALGORITHM?

Dr. Mohammed Arabi, Dr. Khadijah Alhussaini
National guard health affairs, Riyadh, Saudi Arabia

Clinical history:

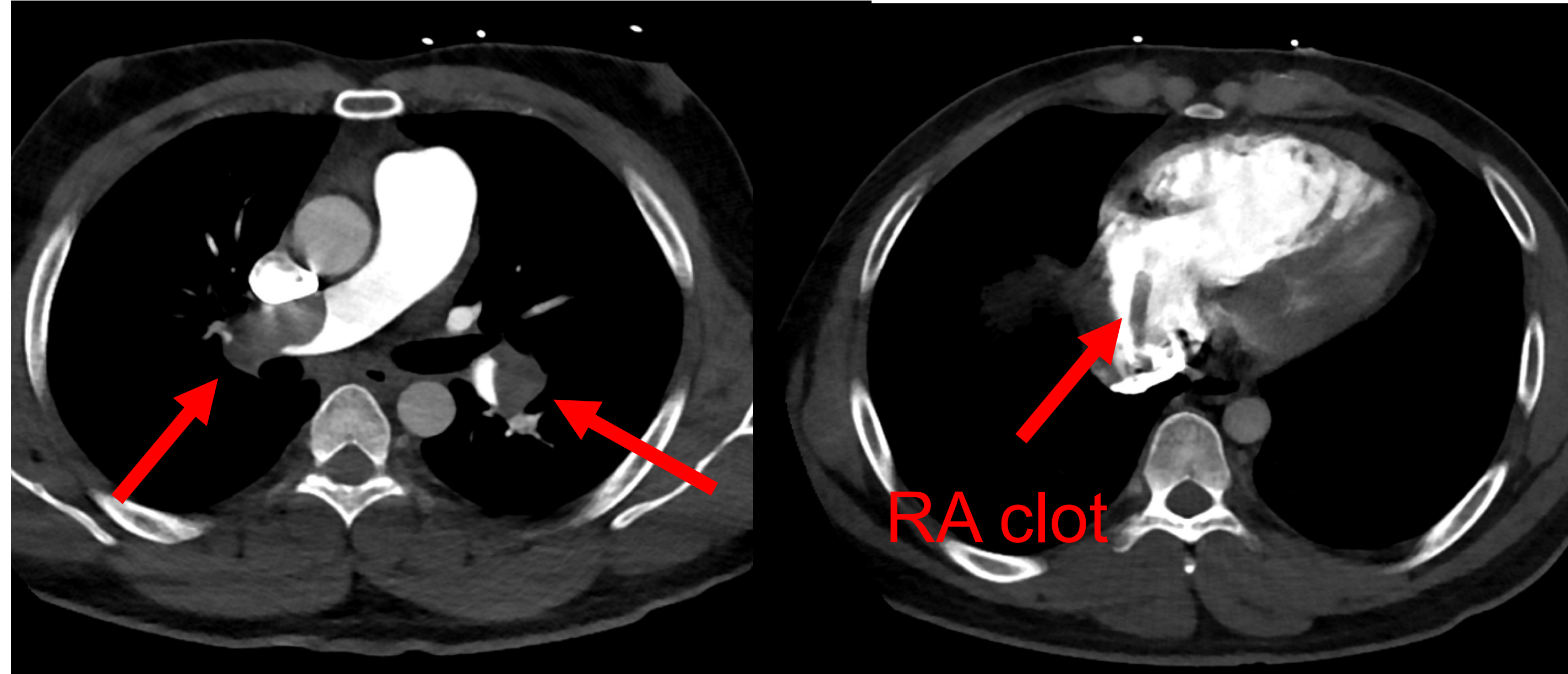
30 y old male, medically free, presented to ED complaining of abdominal pain for 2 days and 1 day history of chest pain with SOB and syncope.

Vital signs indicated persistent tachycardia, tachypnea with maintained O2 Sat on nasal cannula.

Chest CT showed bilateral main pulmonary artery embolism with RV strain and right atrial clot in transit.

Cardiac echo showed normal EF >50% and flattened septum consistent with RV pressure overload (>60mmHg). The RV was moderately to severely dilated with moderately reduced systolic function and hyperdynamic RV apex (McConnell's sign).

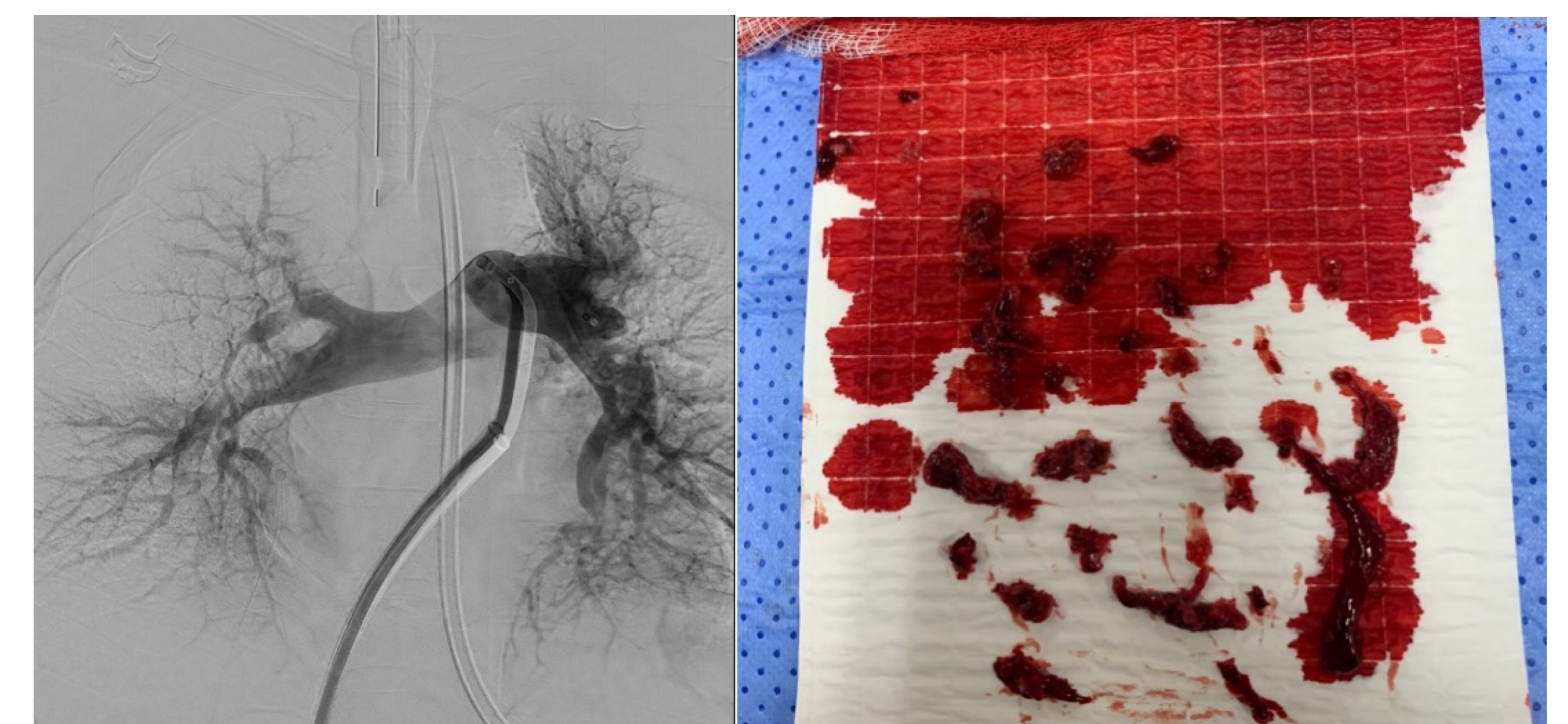
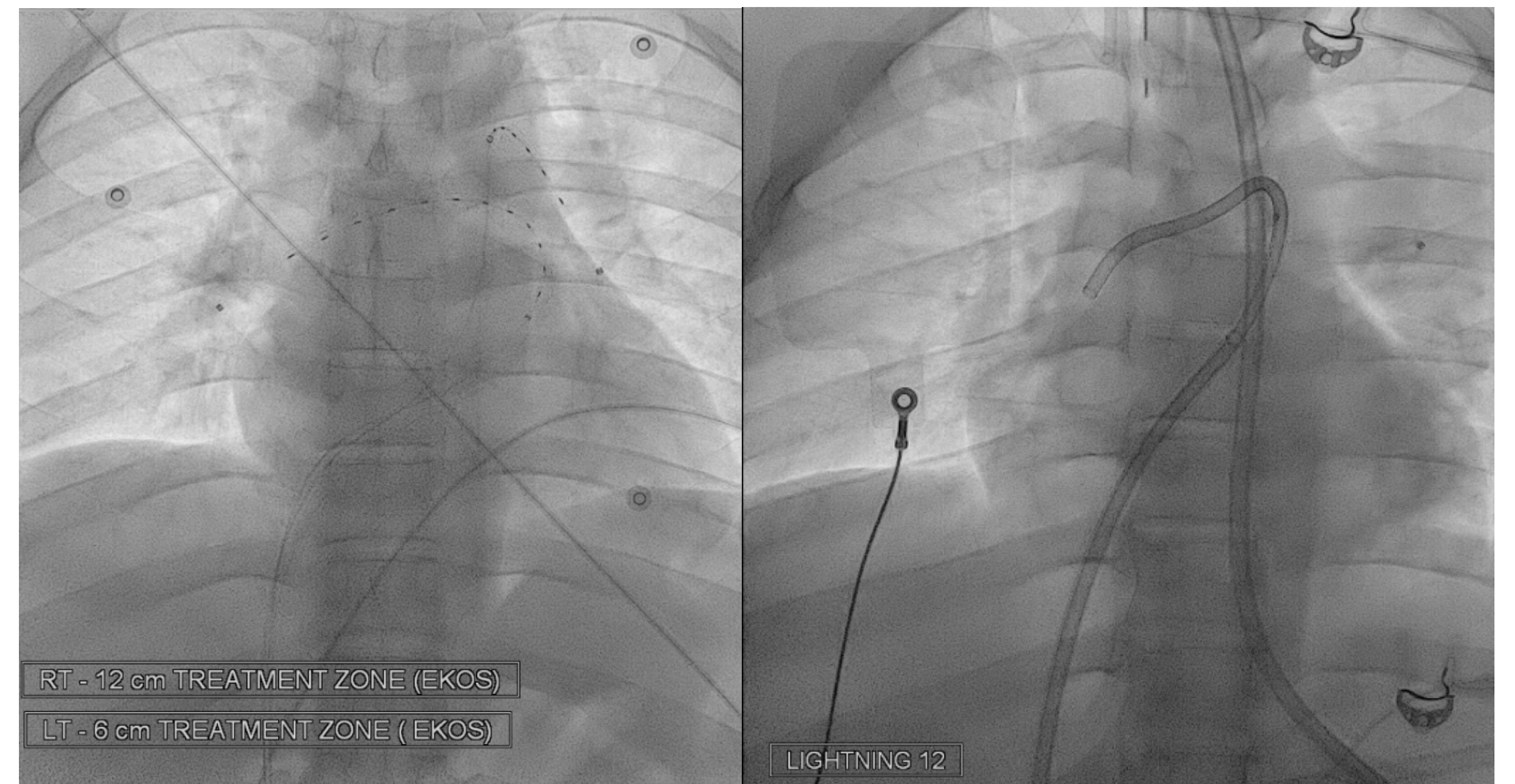
Labs values indicated elevated Troponin I: 95 , BNP: 216 and D-dimer: 11.28.



Treatment and procedure:

Considering the intermediate-high risk presentation of PE, Ultrasound assisted catheter thrombolysis was chosen as a treatment approach. Two separate accesses with 7 Fr sheath. The pulmonary arteries were cannulated and insertion of two EKOS catheters (6 cm and 12 cm infusion length). The patient was initiated on lysis with TPA dose at a rate of 1 mg per catheter per hour. The sheaths were connected to IV heparin infusion with 500 units/hr.

Four hours later the patient started complaining of chest pain and dyspnea leading to multiple cardiac arrests with PEA that responded to short cycles of CPR. The patient received 100mg TPA and was shifted back to IR suite for mechanical thrombectomy by Lightning 12 Penumbra. Multiple short cycles of intraprocedural cardiac arrests occurred. ROSC was achieved and patient was shifted back to ICU.



Final angiography showed significant reduction in thrombus burden.

Hospital course and outcome

The patient's condition progressively worsened over the following few days due to cardiogenic shock and he eventually succumbed to multi-organ failure.

Discussion

Of all PE cases, 2% – 5% are estimated to be associated with right heart thrombus RHT (clot in transit), which is associated with high mortality rate. A recently published retrospective study of 35 patient with clot-in-transit. 10 patients (28.6%) received anticoagulation alone and 2 patients (5.7%) received systemic thrombolysis, while 23 patients (65.7%) underwent catheter-based therapy (CBT; 22 mechanical thrombectomy and 1 catheter-directed thrombolysis). Compared with anticoagulation alone, patients who received catheter based therapy or systemic thrombolysis had significantly lower rates of in-hospital mortality, resuscitated cardiac arrest, or hemodynamic decompensation.

In a meta-analysis of 13 studies of 492 PE patients with clot-in-transit, the highest mortality was observed with anticoagulation alone (35%), followed by surgical thrombectomy (31%), CBT (20%), and Systemic therapy (12%).

References:

1. Zhang RS, Yuriditsky E, Zhang P, Elbaum L, Bailey E, Maqsood MH, Postelnicu R, Amoroso NE, Maldonado TS, Saric M, Alviar CL, Horowitz JM, Bangalore S. Comparing Management Strategies in Patients With Clot-in-Transit. *Circ Cardiovasc Interv.* 2024 Aug;17(8):e014109.
2. Maqsood MH, Zhang RS, Zlotnick DM, Parikh SA, Bangalore S. Outcomes with treatment interventions for clot-in-transit in patients with pulmonary embolism: a meta-analysis. *J Invasive Cardiol.* 2024 May 21.