

CASE STUDY

Pulmonary Embolism

Treatment of Patient with Bilateral, Intermediate High Risk Pulmonary Embolism using 8mg r-tPA for 4 hours with EKOS™ Acoustic Pulse Thrombolysis™ Therapy

Dr Andrew S.P. Sharp, MBChB, MD, FRCP, Consultant Interventional Cardiologist, Royal Devon & Exeter NHS Foundation Trust, United Kingdom

Patient History

A 56-year-old lady presented to hospital with shortness of breath and dizzy spells after a long drive across country. She looked pale and somewhat unwell.

- Oxygen saturation levels were 88% on room air and heart rate was 110 beats per minute. Blood pressure was 105/65.
- Blood tests showed an elevated D-dimer level.
- Patient was sent for CT pulmonary angiography which showed extensive central pulmonary clot with evidence of right-heart strain.
- Echocardiography confirmed right heart dysfunction, with a calculated RV (5.3cm): LV (3.2cm) diameter ratio of 1.65.

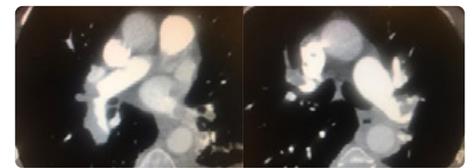


Figure 1: CT pulmonary angiography showing extensive thrombus involving the left and right pulmonary arteries.

Treatment

- The patient underwent EKOS™ ultrasound-assisted, catheter-directed thrombolysis (Acoustic Pulse Thrombolysis™ treatment) in the Cardiac Catheter Laboratory, with 8mg of Alteplase (4mg per catheter) at a rate of 1mg per catheter per hour.
- Total Infusion time was 4 hours starting in the Cardiac Catheter Laboratory for 1 hour and remaining 3 hours in the Coronary Care Unit.
- Interim echocardiography showed substantial offloading of the RV at four hours with a reduction in heart rate to 90 beats per minute and improvement in blood pressure to 122/74, suggesting treatment success. The catheters were extracted whilst the patient was on the Coronary Care Unit.



Figure 2: Transthoracic echocardiogram showing significant dilatation of the right ventricle.

Results

- The following morning, the patient was mobilised, off oxygen therapy with saturations of 95% on air, heart rate of 78 beats per minute and a blood pressure of 128/72.
- She was discharged on the morning of day four after echocardiography showed completion of the process of offloading of the right ventricle with an RV diameter of 3.1cm and an LV diameter of 3.4cm (RV/LV 0.9).
- Follow-up echocardiography and clinic appointment showed complete recovery with normal estimated pulmonary artery pressure and a normal exercise capacity.

Conclusion

- This case illustrates that EKOS™ ultrasound-assisted, catheter-directed thrombolysis can potentially offload the right ventricle – even with very low doses of Alteplase.
- The OPTALYSE PE study has shown that 8mg, 12mg and 24mg of Alteplase (r-tPA) can all offload the right ventricle to a similar extent by 48 hours, with a dose-dependent effect on clot burden. In this case, the priority was to offload the RV, given the haemodynamic status of the patient and we demonstrate here that this was successfully achieved.



Figure 3: Echocardiography showing recovery of right ventricular anatomy.