

## CLINICAL VIGNETTE

# Venoarterial extracorporeal membrane oxygenation in massive pulmonary embolism

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Massive pulmonary embolism still remains an important clinical problem associated with a high mortality rate. This highlights the need for a rapid and appropriate intervention. Our case report presents a successful post-operative venoarterial extracorporeal membrane oxygenation (VA-ECMO) after unsuccessful open-chest thrombectomy. This life-saving procedure helped us manage a massive pulmonary embolism associated with high haemodynamic instability, severe hypoxaemia, and right heart dilatation with ventricular dysfunction. A 63-year-old patient, with a body mass index (BMI) of 29 kg/m<sup>2</sup>, clinically unstable, with massive pulmonary embolism caused by deep vein thrombosis, was transferred to the emergency unit of a cardiac surgery department of a suburban hospital for an invasive treatment of saddle embolus of the pulmonary trunk. Despite the subcutaneous administration of 120 mg enoxaparin on admission, the saddle embolus proceeded to the right and left pulmonary arteries, causing occlusion of segmental branches during the 3-h interfacility transfer (Fig. 1A–E). Because intravenous thrombolysis was strictly contraindicated, emergency open-chest surgery was performed (systolic pressure < 60 mmHg) with thrombectomy of the pulmonary trunk and both pulmonary arteries. Despite the procedure, right ventricular dysfunction dramatically increased less than an hour after the admission to the intensive care unit (right ventricular systolic pressure > 100 mmHg, blood pressure 100/60 mmHg), and the patient's heart went into pulseless electrical activity. The decision was made to perform an open-chest VA-ECMO, which was successful and enabled the stabilisation of the patient's haemodynamics. The haemodynamic status improved in the subsequent hours, and respiratory function was recovered within the next three days. The patient was extubated (Fig. 1F) on the fifth day and the VA-ECMO was removed on day seven. On the eighth postoperative day an inferior vena cava filter was implanted (Fig. 1G), which was then removed on the 21<sup>st</sup> day after deep vein thrombosis had been excluded. The patient was able to mobilise two days after decannulation and was transferred to a rehabilitation ward on day 30. We are pleased to report that 48 days after the surgical procedure the patient recovered and was discharged from hospital. ECMO can provide life-saving treatment in massive pulmonary embolism with fulminant haemodynamic and/or respiratory deterioration. It could be the last-resort solution after unsuccessful open surgical thrombectomy, when other therapies are contraindicated, or when a safe transfer between hospitals is necessary. Nowadays ECMO availability is widespread in cardiac surgery departments, which are prepared to perform the venoarterial procedure.



**Figure 1.** A, B. Massive pulmonary embolism in the main pulmonary arteries (computed tomography); C. Right ventricle dilatation in pulmonary embolism; D. Thrombus in vena cava inferior; E. Thrombus in vena cava superior; F. Central cannulation (trans-thoracic) venoarterial extracorporeal membrane oxygenation (VA-ECMO); G. TRAPEASE® permanent vena cava inferior filter (CORDIS USA)

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