Massive pulmonary embolism management beyond thrombolytic therapy

Background:
High-risk pulmonary thromboembolism patients presenting with cardiogenic shock or cardiac arrest benefit from advanced therapies such as systemic thrombolysis, catheter- or surgical-thrombo-embolectomy, and catheter-directed thrombolytic therapy. Veno-Arterial Extracorporeal membrane oxygenation (VA-ECMO) provides hemodynamic support in cardiogenic shock or cardiac arrest patients.

Case Presentation:
A 45-year-old African American female with a past medical history of mechanical fall two weeks ago presented with two syncopal episodes and severe left knee and calf pain. Upon arrival at the hospital, the patient becomes hypoxic, hypercapnic, tachypneic, and hypotensive. She went into multiple cardiac arrests. Alteplase was administered due to a presumptive diagnosis of pulmonary embolism based on right heart strain found on bedside ultrasound. Despite receiving 2 doses of Alteplase, the patient continued to undergo cardiac arrest. Due to recurrent cardiac arrest despite being on three vasopressor agents - the decision was made to cannulate VA ECMO. CTA pulmonary following ECMO cannulation confirmed bilateral pulmonary emboli in the lobar and subsegmental pulmonary arteries. Due to the distal location of pulmonary embolism, thrombectomy was not indicated. The next day patient developed profound bleeding from gastrointestinal tract and ECMO cannulation site and transfused with 6 units of blood and 3 units of platelet. The anticoagulation threshold of ECMO was decreased. The patient remained on VA-ECMO for a week. Patient recovered with neurological deficits despite having multiple cardiac arrests and severe hemorrhagic complications. The patient was discharged on an oral anticoagulant for six months. The right and left ventricular function improved to normal within few months of discharge. Her hematological workup was negative for clotting disorders, and she was advised to avoid using an oral contraceptive.

Discussion:
Bleeding complications occur in 30-50% of ECMO patients due to continuous anticoagulation and platelet dysfunction. ECMO cannulation following thrombolytic therapy further increases the risk of bleeding. Our case discusses the management of thrombolytic therapy refractory pulmonary embolism with VA-ECMO and its hemorrhagic complication.

Conclusion:
VA-ECMO can be used as a last resort for hemodynamic support even after administering thrombolytic therapy in pulmonary embolism patients to allow recovery. VA ECMO can be life-saving in severe hemodynamic unstable patient despite the development of hemorrhagic complications.