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Treatment of Massive Pulmonary Embolism with Cardiac Arrest: EKOS Acoustic Pulse Thrombolysis Complemented by ECMO

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On behalf: Mert Dumantepe

Topic(s):
Pulmonary Circulation, Pulmonary Embolism, Right Heart Failure: Intervention

Citation:
Background: Patients with Massive pulmonary embolism (MPE) presenting with right ventricular (RV) dysfunction experience higher mortality due to rapid hemodynamic deterioration. The optimal treatment of MPE is controversial although various treatment approaches have been developed and improved.

Purpose: Here, we presented a series of patients with MPE showing hemodynamic collapse, who were successfully treated with extracorporeal membrane oxygenation (ECMO) as an adjunct to ultrasound-accelerated catheter-directed thrombolytic therapy (UACDT).

Method: From April 2015 to May 2018, 23 patients with MPE with cardiac arrest were retrospectively included. The mean age was 53.6 ± 9.2 years. 10 (43.4%) patients were female. All the patients had cardiac arrest, either as an initial presentation or in-hospital cardiac arrest after presentation. All patients exhibited acute symptoms, computed tomography (CT) evidence of large thrombus burden, and evidence of right ventricular (RV) dysfunction and/or failure. Patients with MPE were treated with UACDT with the EKOS? Acoustic pulse thrombolysis (EKOS Corporation, Bothell, WA, USA) complemented by percutaneous A-V ECMO. Primary outcome was all-cause 30-day mortality.

Results: Eighteen patients survived to hospital discharge, with a mean ICU stay of 8.5 ± 1.7 days (range 6 to 14) and mean length of hospital stay of 15.6 ± 7.2 days (range, 11 to 43 days). Five patients died from refractory shock. Thirty-day mortality was 21.7% (5/23) and one-year mortality was 26.1% (6/23). The mean RV/LV ratio decreased from 1.33 ± 0.18 to 0.91 ± 0.14 at follow-up (p<0.001) and Modified Miller score was significantly reduced from 27 ± 5 to 12 ± 3 (p<0.001) in patients who survived to discharge. Mean ECMO duration was 4.9 days, ranging from 4-13 days. The mean tissue plasminogen activator (tPA) dose for all patients was 16.5 ± 2.3 mg and the mean infusion time was 16.8 ± 2.3 hours.

Conclusion: Patients with massive pulmonary embolism who suffer a cardiac arrest have high morbidity and mortality. UACDT complemented by ECMO could be a successful treatment option for the patients who have MPE with circulatory collapse.
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