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Ultrasound-accelerated catheter-directed thrombolysis: a new tool for the treatment of pulmonary embolism in Brazil

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Introduction: Pulmonary Embolism (PE) is a major cause of acute mortality and long-term morbidity.⁽¹⁾ Anticoagulation and systemic thrombolysis are the initial treatment methods but can be associated with hemorrhagic side effects, excluding a significant portion of patients from these strategies.⁽²⁾ The EkoSonic Endovascular System (EKOS), an ultrasound-facilitated, catheter-directed, low-dose fibrinolysis therapy, emerges as a valuable option.^(2,3)

Objective: To describe a case of a patient with pulmonary embolism treated with EKOS.

Case report: A 63-year-old female patient presented to the emergency department with acute dyspnea. Her comorbidities include a non-small-cell lung carcinoma treated with surgical resection and epidermal growth factor receptor tyrosine kinase inhibitors. Besides, she had been submitted to a transthoracic lung biopsy 2 days previous hospital admission for the investigation of tumor metastasis. Physical examination showed a conscious patient, a heart rate at 126bpm, blood pressure at 130/76mmHg, respiratory rate at 40bpm, and peripheral oxygen saturation at 82%. The Pulmonary Embolism Severity Index was 163 and troponin levels were elevated. An echocardiography revealed an increased right ventricle/left ventricle ratio (RV/LV), and an elevated pulmonary artery systolic pressure (PASP=44mmHg). A CT pulmonary angiography (CTPA) was also performed, showing a filling defect in the main trunk of the pulmonary artery with extension to the left lobar and segmental pulmonary arteries. After a multidisciplinary discussion, the EKOS system was indicated. Under general anesthesia, using anterograde percutaneous access of the right common femoral a 5.4-Fr x 18cm treatment zone EKOS system was positioned from the main pulmonary artery to the left segmental pulmonary artery and the thrombolytic therapy was started. Alteplase was given through the catheter with a total of 24 mg over 24 hours and anticoagulation with non-fractionated heparin was initiated. There were no intraoperative complications. A 24-hour control CT was performed showing significant thrombus resolution. Besides, an echocardiography demonstrated improvement in RV/LV ratio and in the PASP (31mmHg). A 36-hour control angiography showed important improvement in the left lung perfusion and the device was retrieved. The patient was extubated on the third day and received hospital discharge after 12 days. Complications included an oropharyngeal bleeding with no hemodynamic repercussion.

Discussion: This is the first description of the use of EKOS in the treatment of a patient with PE in

Brazil. The rationale behind this therapy is using ultrasound energy to promote mechanical thrombus breakdown, which increases the available surface area for the thrombolytic agent's action.^(2,3) Thus, there is reduction in the total thrombolytic dose enabling more patients to be submitted to an effective recanalization strategy.

Conclusion: The Ekos is a promising additional tool for the treatment of selected cases of pulmonary embolism.

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