

Veno-arterial extra-corporeal membrane oxygenation as rescue therapy in complicated balloon pulmonary angioplasty

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INTRODUCTION

Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare, progressive disease that can result in right ventricular failure and poor survival prospects if left untreated. Adequate treatment, provided in specialized tertiary centers, is crucial for improving the unfavorable prognosis. Treatment options typically include pulmonary artery endarterectomy, balloon pulmonary angioplasty (BPA), and pharmacotherapy [1–3].

We present a case of a 54-year-old male with inoperable CTEPH, admitted to the cardiology department for BPA. Previous treatment for CTEPH included 4 uncomplicated BPA procedures and targeted pharmacotherapy with riociguat 2.5 mg 3 times daily. The patient was on chronic anticoagulation treatment with warfarin. His medical history included a previous episode of acute pulmonary embolism, thrombocytosis, and hypothyroidism. The patient was admitted in good general condition with exertional dyspnea in WHO functional class II, an N-terminal proB-type natriuretic peptide concentration of 1116 pg/ml, and a 6-minute walk test distance of 510 m.

Right heart catheterization, before the current BPA procedure, revealed precapillary pulmonary hypertension with a mean pulmonary artery pressure of 55 mm Hg and pulmonary vascular resistance of 13 Wood units. The fifth BPA procedure involved treating lesions,

including subtotal occlusions, webs, and ring-like stenosis lesions in subsegmental arteries of segments A1, A5, A6, A8, A9, and A10 of the left lung (Figure 1).

Following the procedure, the patient was transferred to the ward in good condition with arterial blood oxygen saturation of 98%. On the next day, 24 hours after the procedure, the patient developed progressive dyspnea with foamy sputum, tachycardia, and oxygen saturation decreased to 80%. Arterial blood pressure was 140/80 mm Hg. Auscultation revealed crackles over the base of the left lung, which over time became audible over the pulmonary fields of both lungs. X-ray findings showed signs of bilateral opacities consistent with reperfusion pulmonary edema (Figure 1).

Due to the progression of dyspnea, oxygen therapy was escalated from a reservoir mask to a high-flow nasal cannula and subsequently to non-invasive positive-pressure ventilation. Pharmacotherapy included intravenous loop diuretics, glucocorticoids, and empirical antibiotics. With further worsening of respiratory failure and arterial blood gases indicating hypoxemia, hypercapnia, respiratory acidosis, and increasing lactate levels, following anesthesiology consultation, the patient was intubated and placed on ventilator therapy. As ventilation was still inadequate, we decided to initiate veno-arterial extracorporeal membrane oxygenation (ECMO). This intervention facilitated clinical improvement and gradual

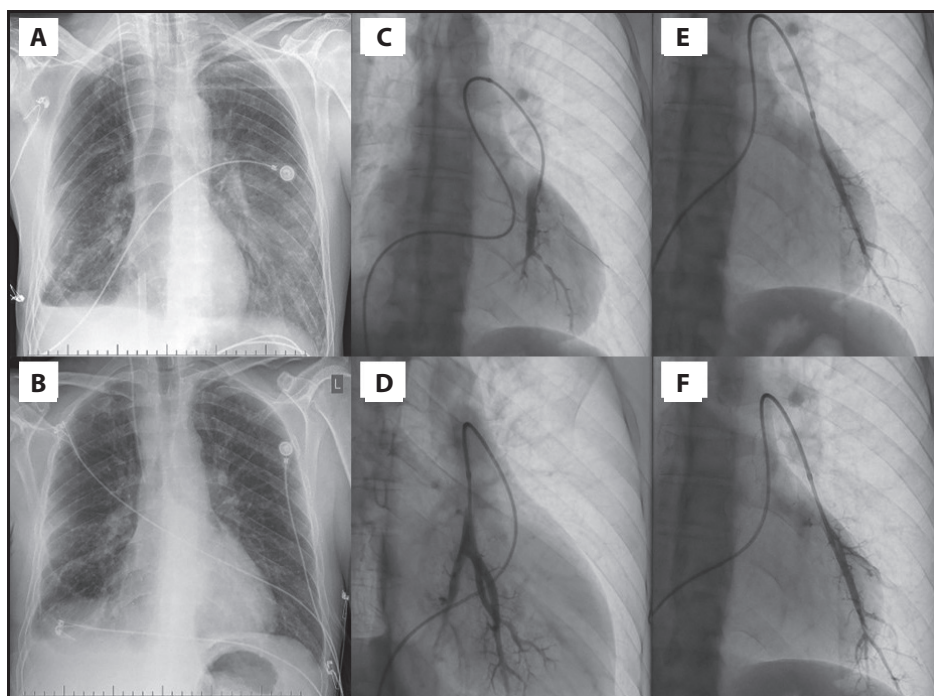


Figure 1. Chest X-ray displaying bilateral interstitial opacities taken the day after the BPA procedure (A) and after a week of therapy for reperfusion pulmonary edema (B). Pulmonary angiogram displaying the pulmonary artery to segments A9 and A10 before (C) and after (D) the BPA procedure, and the pulmonary artery to segment A8 before (E) and after (F) the BPA procedure

Abbreviations: BPA, balloon pulmonary angioplasty

resolution of pulmonary edema. After a week of intensive care therapy, ECMO was discontinued, and the patient's rehabilitation continued until full recovery. The patient was discharged home after 18 days in good general condition.

BPA is an important therapeutic option for patients with inoperable CTEPH. The described case of reperfusion edema represents a type of lung injury that may occur in 10%–40% of BPA procedures. The risk of such complications increases in patients with mean pulmonary artery pressure greater than 45 mm Hg and unfavorable lesion types such as subtotal occlusions [4, 5]. For BPA procedures to be considered safe, they should be performed in specialized high-volume centers. The presented case underscores the necessity for centers conducting BPA procedures to have access to a comprehensive array of therapeutic interventions, including onsite ECMO during BPA procedures.

Article information

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