CLINICAL IMAGE

Refined balloon pulmonary angioplasty as the first-line therapy of complex thromboembolic lesions in patients with chronic thromboembolic pulmonary hypertension

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Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare disease resulting from unresolved, flow-limiting organized thrombi within proximal and distal pulmonary arteries and secondary remodeling of the pulmonary microvascular bed. Pulmonary endarterectomy (PEA) is the method of choice for curative treatment of CTEPH with excellent long-term results. Yet, in large registries, half of patients with CTEPH are not considered suitable for PEA, due to either technical or medical reasons. The current guidelines of the European Society of Cardiology recommend in this population either balloon pulmonary angioplasty (BPA), targeted medical therapy, or combination of both strategies.[1] Yet, the first-line therapy in patients with CTEPH, offering optimal safety and efficacy, is to be determined.[1,2] Herewith, we describe a patient with CTEPH and very complex, high-risk thromboembolic lesions on pulmonary angiography, with curative BPA as the first-choice therapy, without pulmonary hypertension (PH)-targeted medical therapy.

A 66-year-old woman diagnosed with severe segmental and subsegmental type CTEPH, on long-term oral anticoagulation due to recurrent intermediate-high–risk PE, in World Health Organization (WHO) functional class III and evident signs of right heart failure, was referred to our department. She had coexisting chronic conditions, including hypertension, hyperlipidemia, diabetes mellitus, and hypothyroidism. Right heart catheterization confirmed severe pulmonary hypertension (mean pulmonary artery pressure, 44 mm Hg; pulmonary artery wedge pressure, 10 mm Hg, pulmonary vascular resistance, 9.3 Wood units, cardiac index, 2.3 l/min/m^2). Pulmonary angiography revealed high-risk thromboembolic lesions, mainly total or subtotal segmental and subsegmental occlusions (FIGURE 1A and 1B). Based on age, comorbidities, and the distribution of lesions, the patient was deemed inoperable by a PEA-experienced cardiac surgeon. The patient underwent 8 successful BPA sessions, performed according to the previously described protocol.[3,4] In total, 27 segmental and subsegmental pulmonary arteries were opened with restoration of pulmonary flow and without major complications (during one session, only moderate hemoptysis occurred).[5] Right heart catheterization performed 15 months after the last BPA session showed normal hemodynamics with mean pulmonary artery pressure of 18 mm Hg, pulmonary vascular resistance of 2 Wood units, cardiac index of 2,7 l/min/m^2, and excellent angiographic outcome (FIGURE 1C and 1D). The patient is in the WHO functional class I without signs of right ventricular failure, N-terminal pro-B type natriuretic peptide plasma level dropped from 1383 pg/ml to 144 pg/ml and the 6-minute walk distance test increased from 240 to 550 meters.

Whilst PEA is the treatment of choice in CTEPH, there is a growing body of evidence that BPA can result in normalization of hemodynamics, either with or without combination with PH-targeted drugs.[2] In the reported patient, despite high burden of lesions, refined BPA led to normalization of hemodynamics, with significant functional improvement and without any major adverse events in almost 2 years of follow-up. Our report demonstrates a new approach to complex patients with CTEPH in our high-volume BPA

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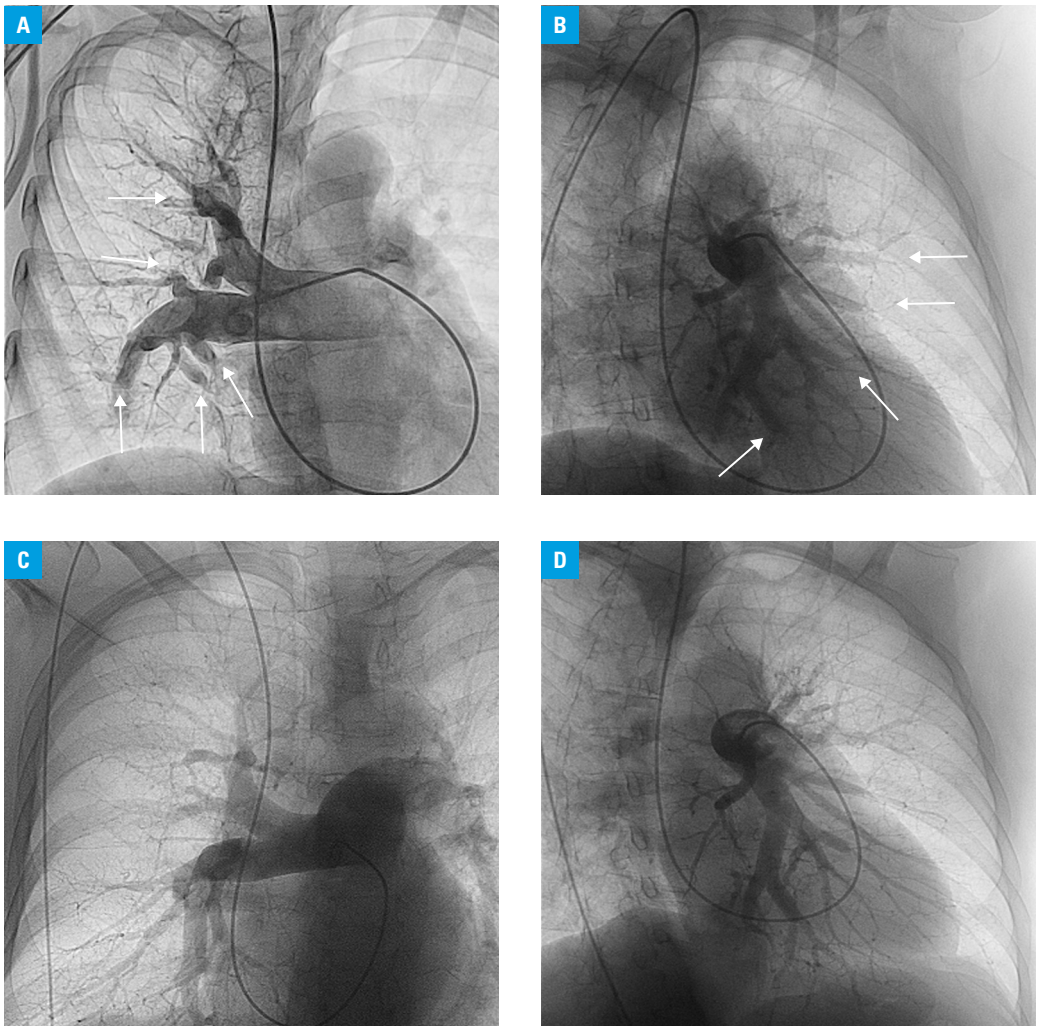

FIGURE 1 Angiographic images before (**A** and **B**) and after (**C** and **D**) balloon pulmonary angioplasty in a patient with chronic thromboembolic pulmonary hypertension: **A**, **B** – angiographic view of the left and right pulmonary artery before balloon pulmonary angioplasty (subtotal and total occlusions – arrows); **C**, **D** – angiographic view of the left and right pulmonary artery after successful balloon pulmonary angioplasty

center. With emerging international experience and ongoing technical refinements, BPA can be safely performed, with significant improvement in hemodynamics and functional capacity, even without PH-targeted drugs, with excellent long-term outcomes. Nevertheless, this strategy needs further assessment in a large, prospective study, with a head-to-head comparison of refined BPA and PH-targeted medical therapy.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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