

Successful percutaneous treatment of stenosis in 3 pulmonary veins

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Pulmonary vein stenosis (PVS) is a well-known complication of radiofrequency ablation of atrial fibrillation (AF). It is defined as a significant reduction in the diameter of a pulmonary vein due to the replacement of necrotic myocardium by collagen. The incidence of severe PVS is low (1%–2%) due to the improved ablation techniques.¹ The presentation varies from patients remaining asymptomatic and casually diagnosed by imaging tests to very symptomatic patients. The most common symptoms are cough, hemoptysis, and dyspnea, and it is associated with high morbidity and mortality rates because of lung injury as a consequence of pulmonary hypertension. Once the diagnosis is made, an early intervention is the most recommended option due to the probability of progression towards occlusion. Percutaneous techniques are preferred over surgery.¹

A 66-year-old woman with paroxysmal AF was admitted to the emergency department several times for palpitations despite treatment with full-dose of flecainide. Radiofrequency isolation of the pulmonary veins was proposed and accepted. Using a computed tomography (CT) and NavX™ (St. Jude Medical, Saint Paul, Minnesota, United States), cardiac mapping system technology (FIGURE 1A and 1B), an antral and circumferential isolation was performed. Four months later, the patient presented with progressive cough and dyspnea and suspicion of PVS that was confirmed on CT (FIGURE 1C). The case was discussed during a heart team meeting and percutaneous approach was decided. Right heart catheterization confirmed pulmonary hypertension and a significant hemodynamic gradient

in each stenotic vein (FIGURE 1D). Balloon predilation (5.5 × 12 mm) followed by an implantation of balloon-expandable cobalt-chromium stents was performed with gradient improvement (FIGURE 1E and 1F). Omnilink Elite Vascular Balloon-Expandable™ stents (Abbott, Chicago, Illinois, United States) were implanted in the left superior (10 × 19 mm), lower left (8 × 19 mm), and lower right pulmonary vein (7 × 16 mm) (Supplementary material, *Figures S1 and S2, Videos S1–S5*).

After a 1-year follow-up, the patient remains asymptomatic with no pulmonary hypertension on transthoracic echocardiogram or restenosis on control CT.

Current knowledge about the best treatment for PVS is limited. Surgical options are complex, with no standardized techniques. The percutaneous approach with stent implantation has slower restenosis rates than simple balloon angioplasty.^{2,3} In cases affecting bifurcations, the lack of specific devices complicates its management, and experienced operators apply bifurcation techniques similar to those used in coronary arteries. Peripheral large-caliber bare metal stents have been associated with acceptable long-term outcomes and are the preferred devices over coronary drug-eluting stents. Coronary drug-eluting stents were associated with a high rate of restenosis and should not be used in the majority of cases.³

To our best knowledge, this is the first case report of simultaneous angioplasty and stenting of 3 PVS. More clinical data are needed to define the proper management of this condition, but nowadays, the percutaneous approach with stent implantation seems to be the best choice of treatment for symptomatic PVS.

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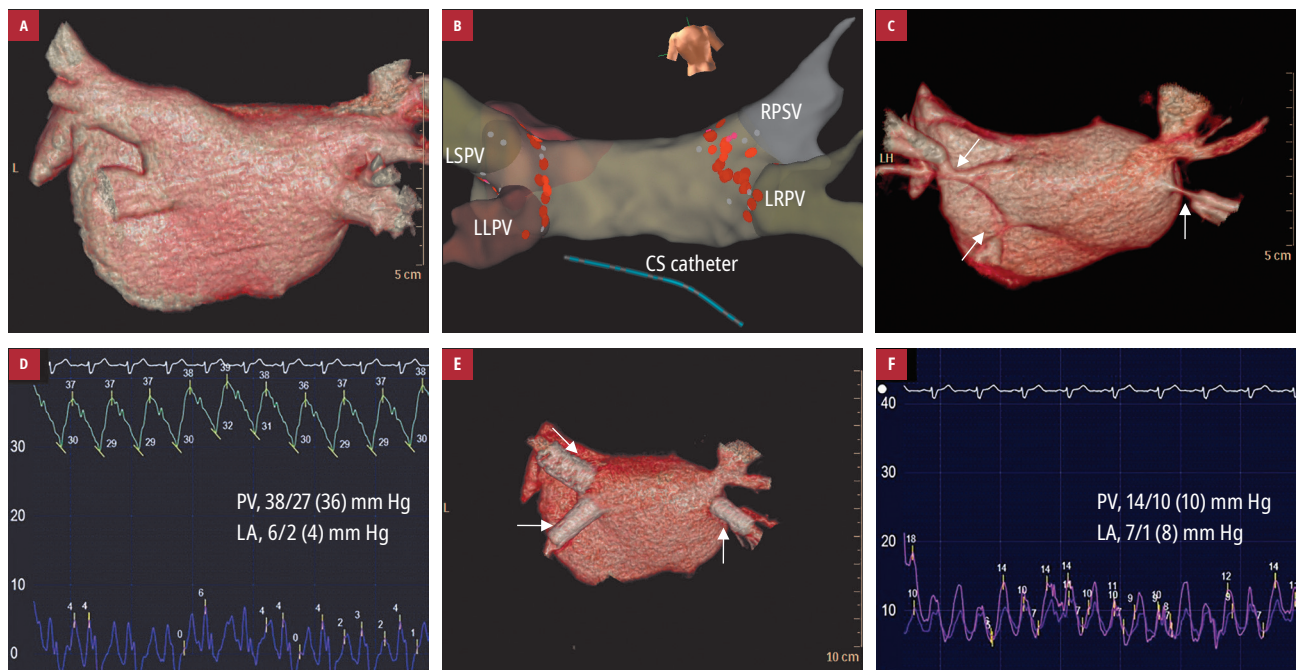


FIGURE 1 **A** – computed tomography reconstruction of the left atrium (LA) and pulmonary veins (PVs) before ablation; **B** – LA and PV reconstruction using NavX™. Red dots correspond with radio frequency applications. **C** – the LA and PVs after ablation; severe stenosis of 3 veins (arrows); **D** – hemodynamic parameters in the LA and PV before treatment; **E** – final result after treatment with 3 stents (arrows); **F** – hemodynamic parameters after treatment
Abbreviations: CS, coronary sinus; LSPV, left superior pulmonary vein; LLPV, lower left pulmonary vein; RSPV, right superior pulmonary vein; LRPV, lower right pulmonary vein

SUPPLEMENTARY MATERIAL

Supplementary material is available at www.mp.pl/kardiologiapolska.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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