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Case Report

A Case Report: A Successful Management of Extrinsic Compression of the Left Main Coronary Artery by a Dilated Pulmonary Artery in Patients with Pulmonary Arterial Hypertension

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Abstract

Extrinsic compression of the left main coronary artery (LMCA) by a dilated pulmonary artery can be life threatening in pulmonary arterial hypertension patients; however, it can be treated with percutaneous coronary intervention. In this case report, we presented a successful treatment with the stenting of the LMCA stenosis associated with extrinsic compression of LMCA by a dilated pulmonary artery.

Keywords: Dilated pulmonary artery; left main coronary artery stenting; pulmonary arterial hypertension.

Bir Olgu Sunumu: Pulmoner Arteriyel Hipertansiyon Hastasında Dilate Pulmoner Arterin Sol Ana Koroner Artere Dışarıdan Basısı ve Başarılı Yönetimi

Özet

Pulmoner arteriyel hipertansiyon hastalarında dilate pulmoner arterin sol ana koroner artere dışarıdan basısı hayati tehlike oluşturan bir durumdur fakat perkütan koroner girişimle tedavi edilebilir. Bu olgu sunumda, dilate pulmoner arterin sol ana koroner artere dıştan basısı ile ilişkili ciddi sol ana koroner arter darlığının stentleme ile başarılı bir şekilde tedavisini sunuldu.

Anahtar sözcükler: Dilate pulmoner arter; sol ana koroner stentleme; pulmoner arteriyal hipertansiyon.

Introduction

The case of extrinsic compression of the left main coronary artery (LMCA) due to a dilated pulmonary artery (PA) can be observed in pulmonary arterial hypertension (PAH).[1] This compression can cause chest pain, arrhythmia, and sudden cardiac death. The recognition of the condition could be of great help during treatment management to evaluate the possibility of the treatment with a coronary stent.[2] In our case, we discussed extrinsic compression

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of the LMCA in a patient with PAH who was treated with percutaneous coronary intervention.

Case Report

A 22-year-old woman was admitted to our hospital with chest pain and worsening dyspnea from the earthquake zone of Turkiye. The patient had been experiencing the symptoms of progressive shortness of breath and edema in the legs for a year. She was not on any medication. The New York Heart Association (NYHA) functional classification of the patient was class III, and 6-min walk distance (6MWD) was 220 m. Her physical examination revealed moderate bilateral pitting edema in the lower extremities and jugular venous distention. The electrocardiogram revealed a normal sinus rhythm, right bundle branch block, and findings of right ventricular (RV) hypertrophy. Chest X-ray showed cardiomegaly and an enlarged pulmonary trunk. The initial laboratory examination showed a normal range of troponin T-levels but a significantly elevated level of NT-proBNP (2367 pg/mL). Transthoracic echocardiogram revealed a normal left ventricular systolic function (ejection fraction 60%), severe enlargement of the right heart chambers with RV hypertrophy, normal RV systolic functions [Tricuspid annular plane systolic excursion 16 mm; Tissue Doppler imaging of RV free wall (S') 11.6 cm/sn], and severe tricuspid regurgitation was also detected with the estimated PA systolic pressure level of 120+5 mmHg. Transesophageal echocardiogram revealed an aneurysm of the PA and a moderate pulmonary regurgitation (PR) flow. Mean PA pressure was 74+5 mmHg based on the PR flow. In addition, no left-to-right shunt or anomalous pulmonary venous return was identified. On computed tomography (CT), the diameter of the main PA was measured as 50.2 mm, and no pulmonary embolism was detected. Catheterization of the patient revealed cardiac pressures consistent with pre-capillary pulmonary hypertension (PH) with normal capillary wedge pressure and increased pulmonary vascular resistance range of 21 wood units. An acute vaso-reactivity testing was performed and the result was negative. The coronary angiography demonstrated a retrograde filling starting from the right coronary system to the left system and severe compression of the LMCA (Fig. 1 and Video 1–3). Coronary CT angiography confirmed a slit-like compression of the ostial part of the LMCA (Fig. 2a, b). After the mentioned findings, the patient was diagnosed with the World Health Organization Group 1 PAH. The heart team decided to administer 10 mg of macitentan once daily and tadalafil 40 mg (initially 20 mg) once daily to the patient for the treatment of PAH. In addition, an LMCA stent intervention was also planned for the patient.

A written informed consent was obtained from the patient before the procedure. The patient was administered a loading dose of 600 mg of clopidogrel and acetylsalicylic acid before the intervention of the LMCA. A 4.0×19 mm drug-eluting stent was directly implanted in the LMCA at 18 atm; then, post-dilatation was performed using a 5.0×12 mm non-compliant balloon (Fig. 3). Full revascularization was achieved, and no complications were observed. Following a successful percutaneous intervention, the patient developed swelling, redness, and pain in the left foot. A lower extremity venous Doppler ultrasound was performed and venous thrombosis was detected in the lower extremity. The patient was then administered 0.6 mg of enoxaparin twice daily and 5 mg of warfarin tablet once daily. Following the medical and interventional treatment of the patient, a significant clinical improvement was achieved. The

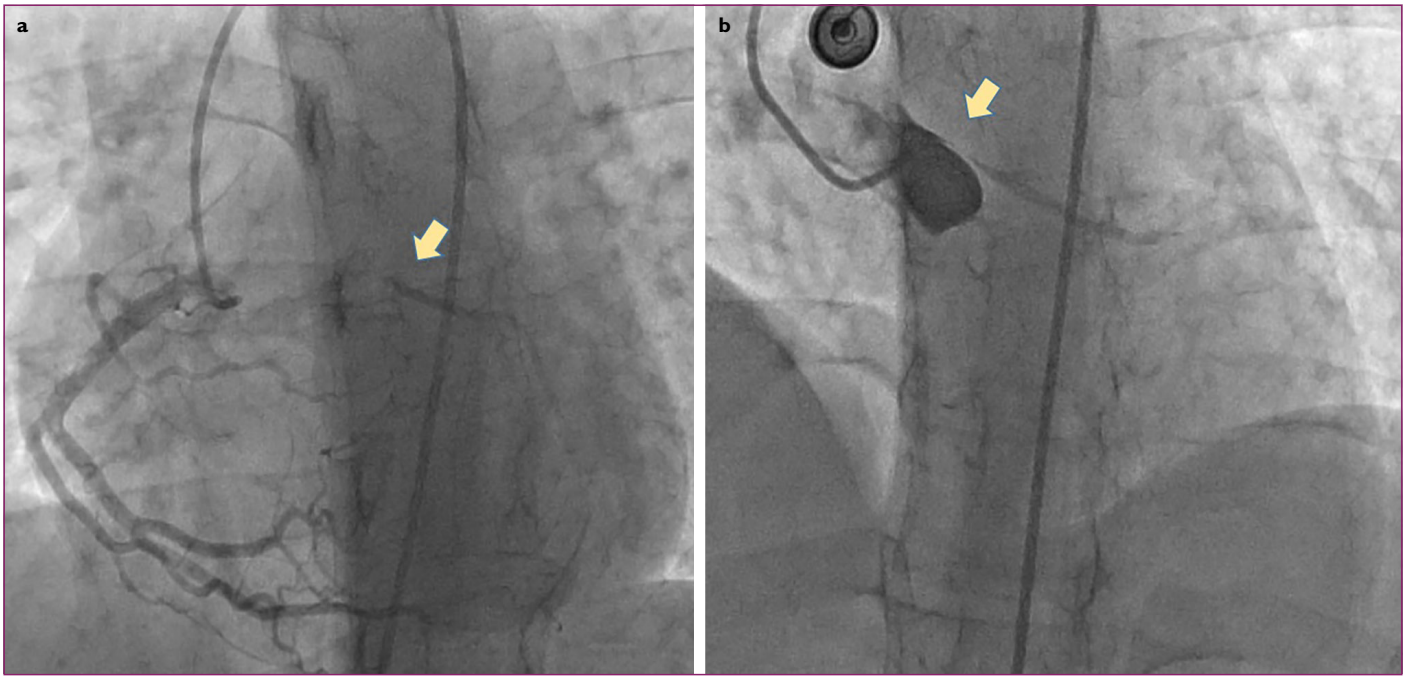

Figure 1. (a) In the coronary angiography images, retrograde filling of the left system from the right system was observed (yellow arrow), (b) Severe LMCA stenosis was observed in the imaging of the left system on coronary angiography (yellow arrow).

LMCA: Left main coronary artery.

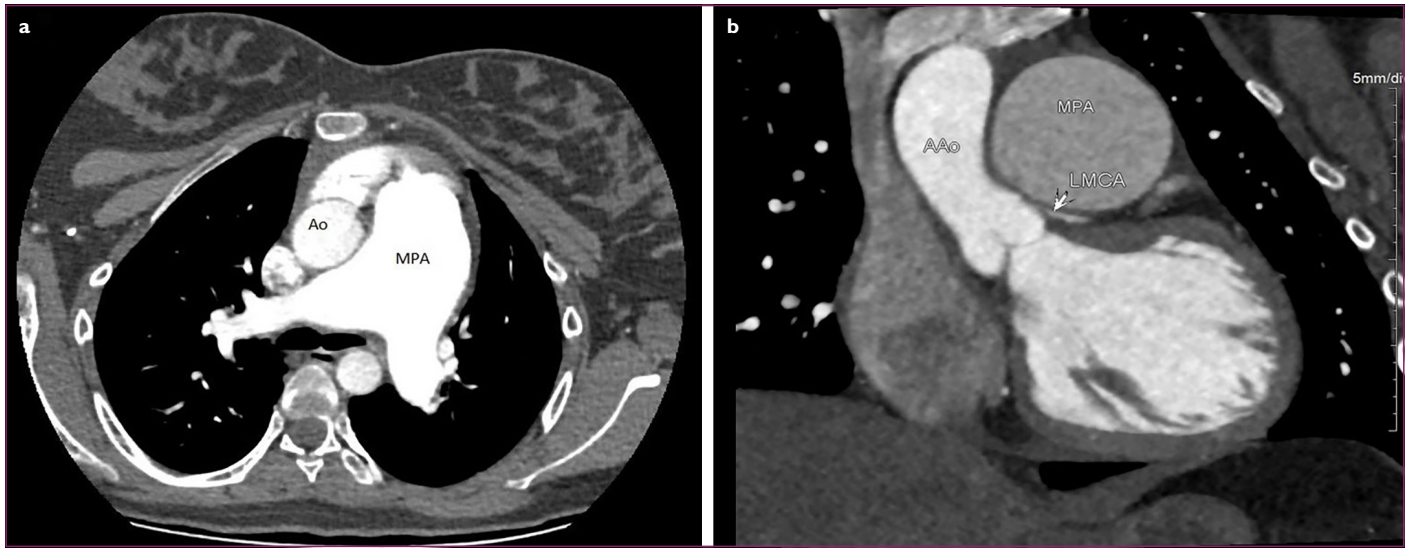

Figure 2. (a) An aneurysmal dilatation of the pulmonary artery was observed on thorax CT. (b) On coronary CT angiography, an external compression of the aneurysmal pulmonary artery was observed.

Ao: Aorta; MPA: Main pulmonary artery; LMCA: Left main coronary artery; CT: Computed tomography; AAo: Ascending aorta.

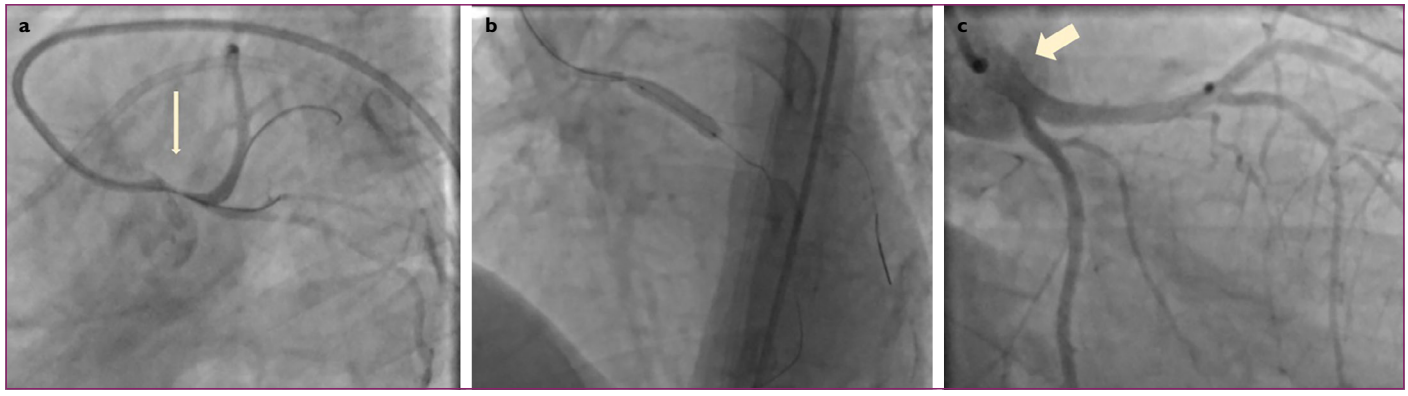

Figure 3. (a-c) Successful LMCA stenting.

LMCA: Left main coronary artery.

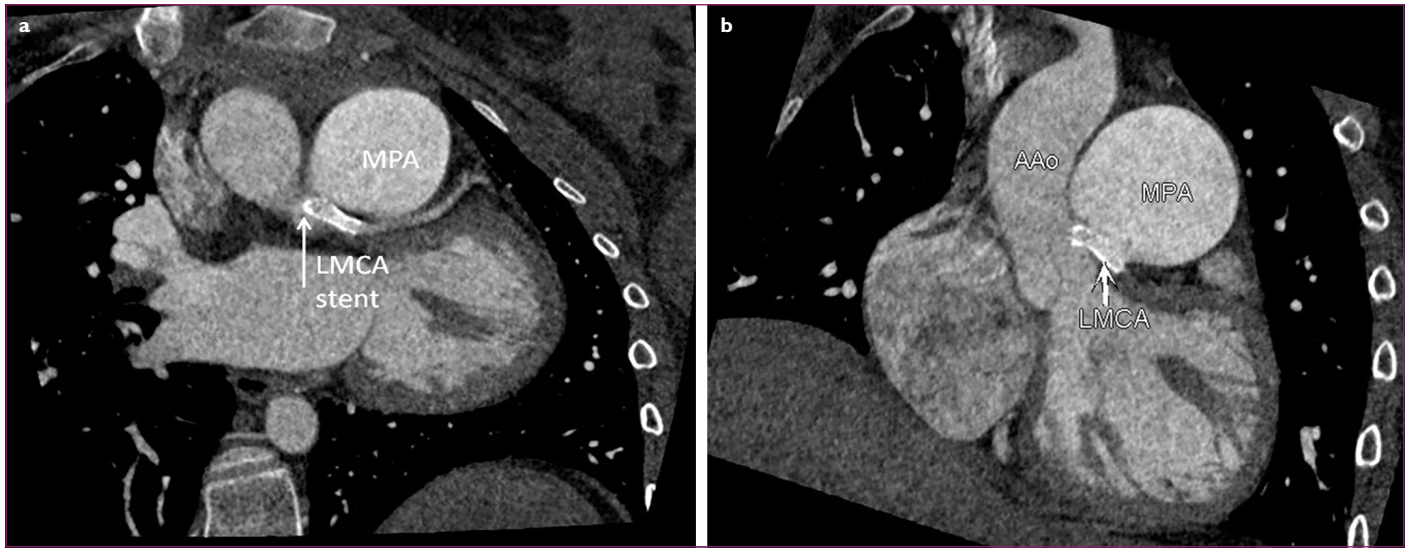

Figure 4. The LMCA stent was visualized as the patent on coronary CT angiography.

MPA: Main pulmonary artery; AAo: Ascending aorta; LMCA: Left main coronary artery; CT: Computed tomography.

patient was discharged from the hospital with dual PAH-specific therapy, dual antiplatelet and anticoagulant treatments. In the 1-month follow-up, the patient was classified as NYHA class 2, and the 6MWD test was 550 m. A follow-up coronary CT angiography showed that the stent in the LMCA was patent (Fig. 4).

Discussion

The extrinsic compression of LMCA by dilated PA in PAH patients is the reason for angina pectoris and ventricular ischemia and is also treatable.[1,2] The incidence rate of LMCA compression due to dilated PA in PH is 5–44%.[3] The treatment options for this condition include percutaneous coronary intervention (LMCA stenting), coronary artery bypass grafting, and heart-lung transplantation. Percutaneous coronary intervention is now performed frequently due to its low risk of procedural complications and high success rates.[2,4,5] During the percutaneous procedure, it is critical to use short stents to cover the lesion so that the LMCA stent does not excessively protrude into the aortic lumen and the circumflex artery ostium remains open.

Conclusion

Angina caused by extrinsic compression of LMCA by dilated PA in PAH patients should not be ignored. In these patients, the preferred technique is percutaneous coronary intervention with low complication and high success rates.

Disclosures

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Authorship Contributions: Concept – N.Y., K.M.S., T.A.; Design – M.Y., K.M.S.; Supervision – M.Y., N.Y., T.A.; Funding – M.Y.; Materials – K.M.S., S.K., Ü.B.; Data collection and/or processing – K.M.S., B.U., A.T.C.; Data analysis and/or interpretation – A.K.K., İ.F.A., M.Y.; Literature search – N.Y., T.A.; Writing – N.Y., T.A., K.M.S.; Critical review – M.Y., K.M.S.

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Video 1: Coronary angiography showing the retrograde filling of left coronary system by collaterals issued from right coronary artery.

Video 2: Coronary angiography of left main coronary artery in the right anterior oblique (RAO)/cranial view showing severe LMCA stenosis.

Video 3: Coronary angiography showing the retrograde filling of left coronary system by collaterals issued from right coronary artery.

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