CASE REPORT

Transcatheter therapy of partial anomalous pulmonary venous connection with dual drainage and coarctation of the aorta in a single patient

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A 12-year-old boy was found to have aortic coarctation and a partial anomalous pulmonary venous connection. Historically, multiple cardiac pathologies, such as in the present case, required a surgical approach. We describe transcatheter treatment of the coarctation with a stent and occlusion of the partial anomalous pulmonary venous connection with an Amplatzer vascular plug in a single patient without complications.

1. Introduction

Partial anomalous pulmonary venous connection (PAPVC) is an extremely rare congenital condition where one or more of the pulmonary veins are connected to the venous circulation. Its prevalence within the general population is 0.4–0.7% [1]. Approximately 90% of all PAPVCs originate from the right lung, 7% originate from the left lung, and 3% of patients are found to have bilateral PAPVCs originating from both lungs connecting to the superior vena cava (SVC), the inferior vena cava (IVC), the right atrium, or the innominate vein. Partial anomalous pulmonary venous connections are frequently associated with atrial septal defects [1–3], and are rarely associated with other congenital abnormalities of the heart [4]. Echocardiography is the initial modality of choice for the noninvasive detection of PAPVC [1]. Generally, patients with a partial anomalous pulmonary venous connection, if symptomatic or showing evidence of significant left-to-right shunting, are treated with surgery. Occasionally, it is possible to treat partial anomalous pulmonary venous connections percutaneously by means of an Amplatzer occlusion device (AGA Medical Corporation, USA), although this is only feasible

Disclosure: Authors have nothing to disclose with regard to commercial support.
Received 21 April 2018; revised 21 May 2018; accepted 2 June 2018.

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Peer review under responsibility of King Saud University.
URL: www.ksu.edu.sa
https://doi.org/10.1016/j.jsha.2018.06.003

Production and hosting by Elsevier

Please cite this article in press as: Al Qbandi M., Thinakar Vel M., Transcatheter therapy of partial anomalous pulmonary venous connection with dual drainage and coarctation of the aorta in a single patient, J Saudi Heart Assoc (2018), https://doi.org/10.1016/j.jsha.2018.06.003

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when the anomalous pulmonary veins connect both to the left atrium and the systemic veins. To our knowledge, only few such cases have been previously described in the literature [5–7]. We report a case of transcatheter treatment of coarctation of the aorta and a partial anomalous pulmonary venous connection in a single patient.

2. Case report

A 12-year-old boy presented with persistent headache and leg pain for the past 8 months. On examination, he was found to be hypertensive with blood pressure 132/90 and had an ejection systolic murmur. Subsequent echocardiogram revealed evidence of an aortic coarctation beyond the origin of the left subclavian artery and partial anomalous drainage of the left upper lobe pulmonary vein via a vertical vein into the systemic left innominate vein. He underwent cardiac magnetic resonance imaging, which showed coarctation of aorta and left upper pulmonary vein draining to left innominate vein. The patient's magnetic resonance angiogram study of brain showed no cerebral artery aneurysms. The patient underwent cardiac catheterization and angiography revealed left aortic arch with normal branching and a coarctation just at the origin of the left subclavian artery (Fig. 1) with a peak-to-peak gradient of 20 mmHg and a minimum coarctation diameter of 7 mm and poststenotic diameter of 20 mm and the diameter of descending aorta at the level of diaphragm was 16 mm. A 3.4-cm Bare Cheatham Platinum stent (NuMED Inc., USA) mounted on a 20-mm Z-med II balloon (NuMED Inc.) was positioned across the coarctation and deployed (Fig. 2), with no residual gradient after stenting.

Innominate vein angiogram showed no left superior vena cava but a significant left-to-right shunt via the anomalous venous connection from the left upper lobe pulmonary vein via a vertical vein into the systemic left innominate vein. The oxygen saturations in the left and right pulmonary vein were 98%, in the left innominate vein 98%, and in the right innominate vein 82%. A repeat procedure was undertaken for occlusion of the partial anomalous pulmonary venous connection. Angiography of the left pulmonary artery showed good size left pulmonary artery and confirmed drainage of the left upper pulmonary vein via a vertical vein into the innominate vein (Fig. 3). Angiography of the right pulmonary artery showed good size right pulmonary artery and all right sided pulmonary veins draining to left atrium and no atrial septal defect. The use of 6F Berman wedge catheter balloon occlusion venogram of the vertical vein showed dual supply of the left upper pulmonary vein, one to a vertical vein and the other to the left lower pulmonary vein which is draining to the left atrium (Fig. 4). While occluding the vertical vein, the innominate vein pressure remained at 8–10 mmHg. A 16 × 12-mm Amplatzer Vascular Plug II (AGA Medical Corporation) was used to occlude the vertical vein before its junction with the innominate vein (Fig. 5). Repeat angiography confirmed no residual leak. The patient remained stable and a chest

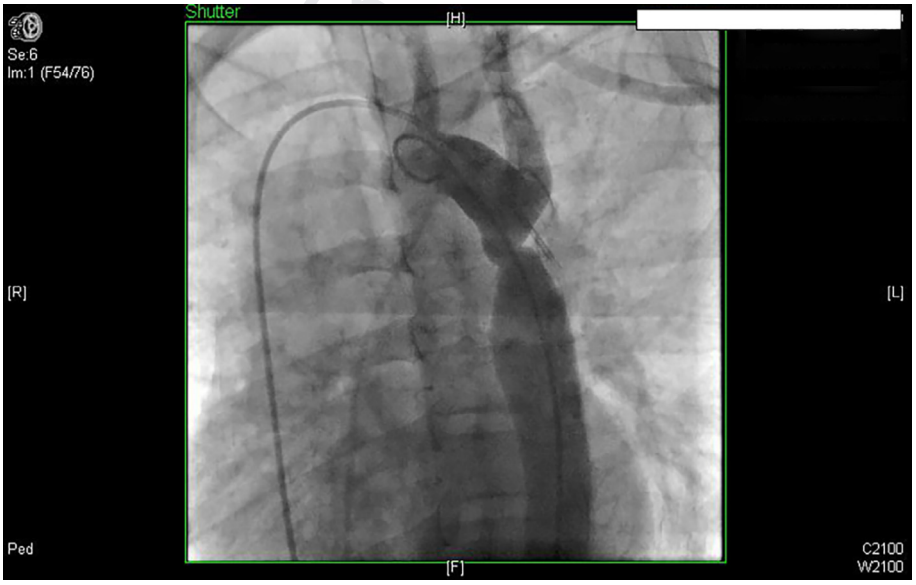

Figure 1. Aortic angiogram illustrating aortic coarctation.

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