

Total or Partial? Rare Cases of Partial Anomalous Pulmonary Venous Return: Three Pulmonary Veins Connected to the Coronary Sinus

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Case 1 was a 7.5-month-old male patient weighing 7.3 kg, who had been hospitalized three times due to bronchiolitis/pneumonia. On physical examination, a 3/6 systolic ejection murmur was heard at the left upper sternal border, and his oxygen saturation (SpO_2) was 98%. Transthoracic echocardiography (TTE) revealed a patent foramen ovale with *left-to-right shunt*, moderate enlargement of the right ventricle, giant coronary sinus (CS) (Figure 1a, Video 1), and a partial anomalous pulmonary venous return (APVR) in which three pulmonary veins drained into the CS (Video 2). Computed tomography (CT) showed three pulmonary veins draining into the coronary sinus (Figure 1b, Video 3). This patient was referred to us with the diagnosis of total APVR.

Case 2 was a 9-month-old male patient weighing 8.5 kg. Similar to the first case, a 3/6 systolic ejection murmur was heard on physical examination. The patient's SpO_2 was 97%. TTE showed a small secundum atrial septal defect with a left-to-right shunt, enlargement of the right heart chamber, and drainage of three pulmonary veins into the CS. The diagnosis was confirmed by CT. The 3D PDF file of Case 2 demonstrates the modeling of three pulmonary veins that are drained into the CS (Appendix 1). This document is included in the 3D PDF HEART ATLAS project of the Turkish Society of Pediatric Cardiology and Cardiac Surgery. Both patients underwent surgery

by unroofing the CS, and tolerated the process well. Postoperative echocardiography showed unobstructed pulmonary venous drainage into the left atrium.

The pulmonary venous connection to the coronary sinus occurs in approximately 3% of partial APVR.¹ A careful echocardiographic evaluation is essential, and all pulmonary veins should be seen draining into the left atrium on TTE. Otherwise, partial APVR should be suspected. Additional examinations, such as Cardiac CT and magnetic resonance, and modeling of cardiac structures in 3D PDF can be performed to confirm the diagnosis.¹⁻³ The most important feature distinguishing partial APVR from total APVR is that the interatrial shunt is left-to-right in the partial APVR and right-to-left in the total APVR as observed in TTE.

Acknowledgments: The authors would like to thank Kula et al. for their technical support on 3D PDF modeling. The 3D PDF file of Case 2 mentioned in this study has been provided as an attachment (Appendix 1). This document requires Adobe Reader to view it. As this 3D PDF technique is different from the standard techniques, watching the information video regarding the use of the 3D PDF file is suggested in Kula et al.'s³ study.



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Received: February 18, 2023 Accepted: March 23, 2023 Available Online Date: May 08, 2023 • DOI: 10.4274/balkanmedj.galenos.2023.2023-2-65

Available at www.balkanmedicaljournal.org

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Cite this article as:

Şengül FS, Ayyıldız P, Türkvatana A, Yıldız O, Güzeltaş A. Total or Partial? Rare Cases of Partial Anomalous Pulmonary Venous Return: Three Pulmonary Veins Connected to the Coronary Sinus. *Balkan Med J*; 2023; 40(3):226-7.

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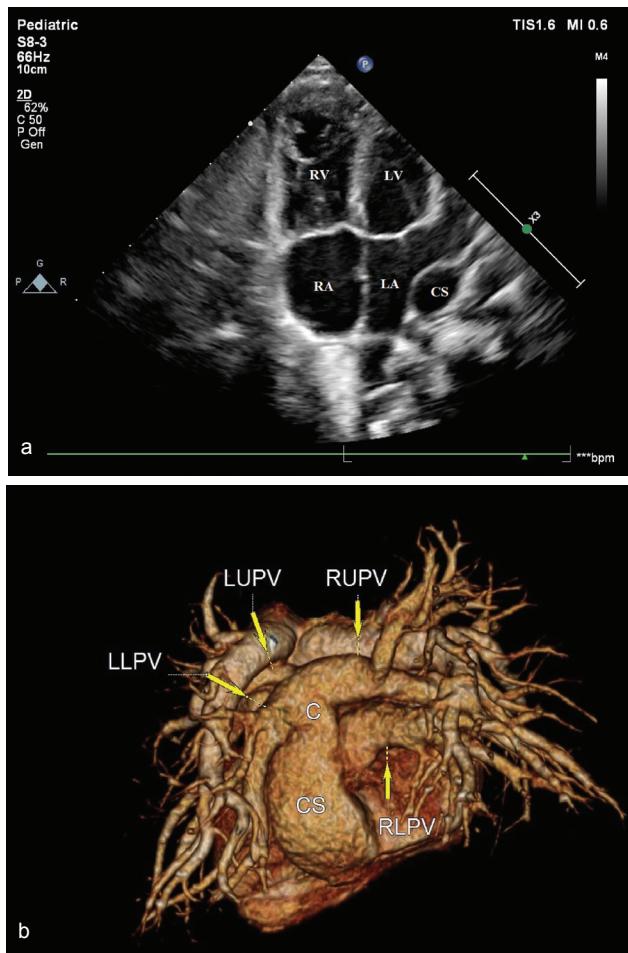


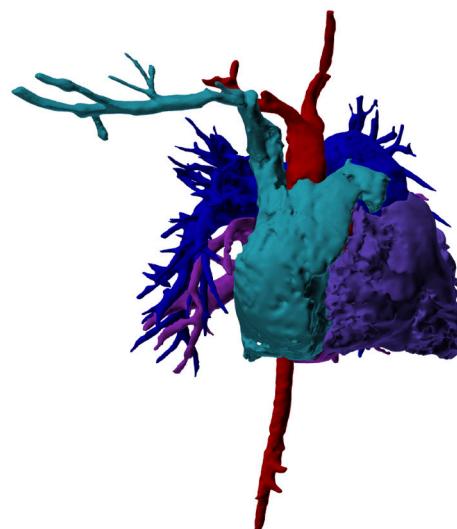
FIG. 1. a) Case 1: Transthoracic echocardiography reveals dilatation of the right heart chambers and the coronary sinus, b) Case 1; 3D-computed tomography (CT) angiography imaging shows that the coronary sinus is dilated, the right lower pulmonary vein is drained into the left atrium, and the other three pulmonary veins are drained separately into the coronary sinus.

CS, coronary sinus; LA, left atrium; LV, left ventricle; LLPV, left lower pulmonary vein; LUPV, left upper pulmonary vein; RA, right atrium; RLPV, right lower pulmonary vein; RUPV, right upper pulmonary vein; RV, right ventricle.

Informed Consent: Informed consent was obtained from the patient's parents.

Authorship Contributions: Concept- F.S.Ş.; Design- F.S.Ş.; Data Collection or Processing- O.Y.; Material- A.T.; Analysis or Interpretation- F.S.Ş.; Literature Search- F.S.Ş.; Writing- F.S.Ş.; Critical Review- A.G.

Conflict of Interest: No conflict of interest was declared by the authors.



APPENDIX 1. The 3D PDF file of Case 2 demonstrates the modeling of three pulmonary veins that are drained into the coronary sinus.



Video 1.

Transthoracic echocardiographic four-chamber view shows the dilated right heart chambers and coronary sinus of Case 1.

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Video 2.

Echocardiographic subcostal sagittal view shows the PFO with left-to-right shunt and pulmonary veins draining into the coronary sinus of Case 1.

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Video 3.

3D-computed tomography imaging shows the dilated coronary sinus, and three pulmonary veins drained into the coronary sinus of Case 1.

10.4274/balkanmedj.galenos.2023.2023-2-65.video3

REFERENCES

- Rajagopal R, Pandey NN, Sinha M, Sharma S. Cardiac Type of Partial Anomalous Pulmonary Venous Connection. *Radiol Cardiothorac Imaging*. 2020;2:e190100. [\[CrossRef\]](#)
- Namkoong M, Choi KB, Lee C. Unusual type of partial anomalous pulmonary venous connection: Three pulmonary veins connected to the coronary sinus. *J Card Surg*. 2017;1-2. [\[CrossRef\]](#)
- Kula S, Tunç O, Kavgaci A, İncedere F. Demonstrating a rare anatomical variation of cardiovascular system by using a new technique. *Anatol J Cardiol*. 2020;24:244-246. [\[CrossRef\]](#)