

Partial anomalous pulmonary venous return associated with vascular anomalies of the aorta: multidetector computed tomography findings

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Partial anomalous pulmonary venous return (PAPVR) is a congenital anomaly that involves drainage of one to three pulmonary veins directly into the right heart or systemic venous system, creating a partial left-to-right shunt. This drainage is associated with cardiac abnormalities such as mitral stenosis and pulmonary stenosis, patent ductus arteriosus, and atrial septal defects. We report a case of PAPVR associated with vascular anomalies of the aorta by multidetector computed tomography in an adult female patient. (Folia Morphol 2012; 71, 2: 115–117)

Key words: partial anomalous pulmonary venous return, vascular anomalies of aorta, MDCT

CASE REPORT

A 33-year-old woman presented with a three-year history of exertional dyspnoea. She had a murmur on physical examination. Chest radiography was interpreted as normal. Echocardiography revealed no evidence of significant structural heart disease. Multidetector computed tomography (MDCT) angiography showed the anomalous return of the right upper lobe vein into the vena cava superior and vascular anomalies of aorta (Figs. 1, 2). The right and left common carotid arteries had a single origin from the arcus aorta and then from the left vertebral artery, left subclavian artery, and aberrant right subclavian artery originating from the aorta (Fig. 3).

DISCUSSION

Anomalous pulmonary venous drainage occurs when pulmonary venous blood drains into the right-side circulation in the heart. This condition constitutes an extracardiac left-to-right shunt. Partial

anomalous pulmonary venous drainage occurs in 0.4–0.7% of people and may be incidentally detected on either CT or magnetic resonance imaging (MRI) [3, 4, 10]. It is more common on the right than on the left side.

Patients with partial anomalous pulmonary venous return (PAPVR) are typically acyanotic and most are commonly only mildly symptomatic or asymptomatic. PAPVRs are left-to-right shunts, but when small they are clinically insignificant. When there is a significant shunt, however, they may cause pulmonary hypertension that results in large pulmonary arteries and a large atrium. Symptomatic patients usually present with supraventricular tachycardia, exertional dyspnoea, and chronic fatigue. The extent of the symptoms and physiological changes depends on the degree of shunting, the number of anomalous veins, and associated cardiac or pulmonary disease. Some authors have suggested that PAPVR becomes clinically significant

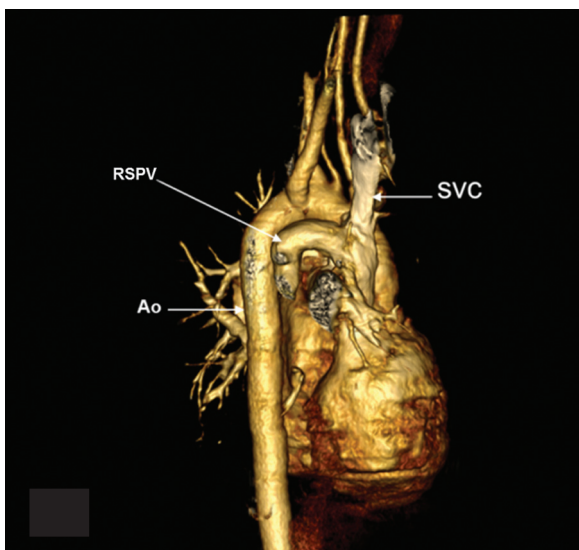


Figure 1. Right postero-lateral view 3-D volume rendering computed tomography image showing drainage of the right upper lobe vein into the vena cava superior; RSPV — right superior pulmonary vein; SVC — superior vena cava; Ao — aorta.

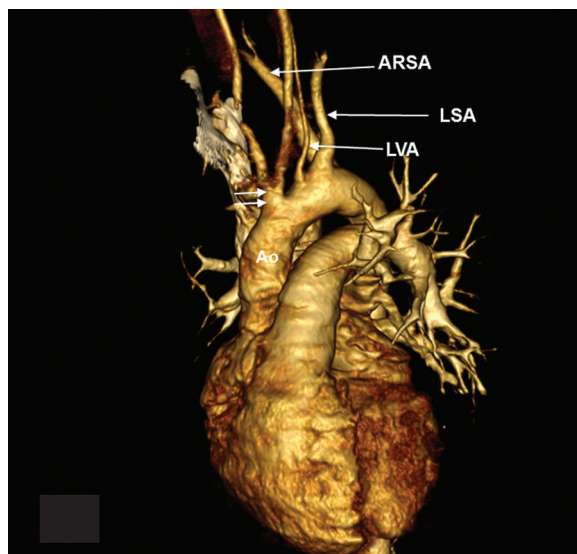


Figure 3. Anterior view 3-D volume rendering computed tomography image showing vascular anomalies of the aorta. Right and left common carotid arteries had a single origin from the arcus aorta (arrows), and then left vertebral artery (LVA), left subclavian artery (LSA), and aberrant right subclavian artery (ARSA) originating from aorta (Ao), respectively.

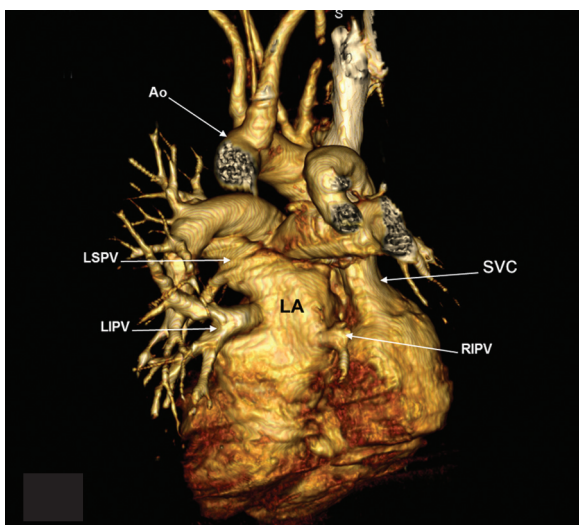


Figure 2. Posterior view 3-D volume rendering computed tomography image showing drainage of the right inferior and left superior and inferior pulmonary veins into the left atrium; SVC — superior vena cava; Ao — aorta; RIPV — right inferior pulmonary vein; LSPV — left superior pulmonary vein; LIPV — left inferior pulmonary vein; LA — left atrium.

when 50% or more of the pulmonary blood flow returns anomalously [3]. Surgical correction can be considered for symptomatic patients with a pulmonary to systemic (Qp:Qs) blood ratio exceeding 1.5 because of the progression to pulmonary hypertension.

Concomitant cardiovascular anomalies, including sinus venous atrial septal defects, may be present in up to 80% of cases. In our case, there was no cardiac anomaly but vascular anomalies of the aorta. The right and left common carotid arteries had a single origin from the arcus aorta, and then the left vertebral artery, left subclavian artery, and aberrant right subclavian artery originating from the aorta. Cardiac CT is ideal for the detection of associated cardiovascular anomalies because of its excellent spatial resolution and large field of view [5–7, 11].

Cross-sectional imaging noninvasively and accurately evaluates the presence and number of anomalous veins and the associated cardiovascular anomalies. Contrast-enhanced MDCTs allow the rapid acquisition of data with high spatial resolution and wide anatomic coverage. In contrast, MRIs require a longer examination with the handicaps of lower spatial resolution, artefacts, and well-known contraindications. Pulmonary angiography with cardiac catheterisation, an operator-dependent and invasive technique, opacifies the normal pulmonary veins, but rarely shows the small accessory and anomalous vessels [1, 2, 8, 9].

CONCLUSIONS

In conclusion, PAPVR is an uncommon anomaly associated with cardiovascular anomalies and subclinical diseases in the adult population, and

it is often achieved by incidental detection on imaging examinations. Contrast enhanced MDCTs are a useful tool for detecting PAPVR and associated anomalies for early diagnosis and/or intervention.

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