

# Editorial commentary in *Radiologia Brasileira*: Multidetector-row computed tomography angiography for the diagnosis of anomalous pulmonary venous drainage: an initial experiment

*Comentário editorial em Radiologia Brasileira: Angiotomografia com múltiplos detectores  
no diagnóstico de drenagem venosa pulmonar anômala: experiência inicial*

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Anomalous pulmonary venous return (APVR) is a rare congenital anomaly in which one or more of the pulmonary veins drain into the right atrium or one of its tributaries instead of the left atrium, creating a left-to-right shunt<sup>(1)</sup>. The surgical indications for partial APVR (PAPVR) depend on detailed anatomic information of the systemic and pulmonary veins, as well as the presence of associated atrial septal defect, and quantification of the left-to-right shunt. For total APVR (TAPVR), knowledge of the exact pattern of pulmonary venous drainage is also very important for appropriate preoperative planning. Classically, the diagnosis of symptomatic pediatric patients is performed by transthoracic echocardiography and confirmed by cardiac angiography. Cardiac angiography is invasive and has a complication rate of 10% to 20% and mortality rate of approximately 1% in this population<sup>(2)</sup>.

The study by Kimura et al.<sup>(3)</sup> in this issue of **Radiologia Brasileira** adds to the developing literature addressing the value of multidetector computed tomography (MDCT) for noninvasive evaluation of APVR. The authors focus on a group of 393 symptomatic patients, most of them in the pediatric population, who underwent cardiac MDCT for evaluation of suspected congenital anomaly. The authors also retrospectively reviewed 2,512

cardiac CT scans performed for evaluation of coronary artery disease. Kimura et al. observed a prevalence of APVR of 5.3% within the patients with suspected congenital anomaly; no cases of APVR were found within the patients with suspected coronary artery disease. Among the cases of APVR, 66.7% were PAPVR and 33.3% were TAPVR. The PAPVR involved the right upper lobe (RUL) in 50% of the cases, left upper lobe (LUL) in 21.4% and was bilateral in 28.6%. The relatively high prevalence of APVR found by Kimura et al. is likely due to the fact that the study was performed in a referral center for congenital cardiopathies. On a retrospective review of 45,538 contrast-enhanced chest CT scans, Ho et al.<sup>(4)</sup> found a prevalence of incidental PAPVR of only 0.1% in the adult population. When diagnosed in adults, PAPVR usually represents subclinical or mild disease with few associated abnormalities and usually consists of a LUL PAPVR or isolated RUL PAPVR without associated atrial septal defect<sup>(4)</sup>.

A limitation of the study by Kimura et al. is the lack of comparison of MDCT to echocardiography, conventional angiography or magnetic resonance imaging (MRI). In another retrospective study, Oh et al.<sup>(2)</sup> compared MDCT to echocardiography in 23 patients with TAPVR. Echocardiography had specificity of 100%, and sensitivity of 87% for detection of the drainage site of the common pulmonary vein, 71% for detection of stenosis of the vertical vein and 0% for evaluation of the course of the atypical vessel into the systemic vein. On the other hand, MDCT had specificity and sensitivity of 100% for the three findings. All results were correlated with surgery or autopsy.

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MRI is known to be useful for evaluation of APVR<sup>(5,6)</sup>. It provides a comprehensive evaluation of pulmonary venous return and the amount of shunt, overcoming most of the limitations of echocardiography. MRI is currently preferred over cardiac catheterization in some institutions because it is less expensive and less invasive. Compared to MDCT, MRI is a longer examination with overall lower spatial resolution. However, the advantages of MRI include the quantification of the left-to-right shunt and the absence of use of ionizing radiation, which is particularly important in the pediatric population who are more sensitive to the effects of ionizing radiation.

In summary, Kimura et al. have demonstrated the usefulness of MDCT angiography for evaluation of patients with APVR given its noninvasiveness and ability to evaluate intra- and extra-cardiac structures.

## REFERENCES

1. Haramati LB, Moche IE, Rivera VT, et al. Computed tomography of partial anomalous pulmonary venous connection in adults. *J Comput Assist Tomogr.* 2003;27:743–9.
2. Oh KH, Choo KS, Lim SJ, et al. Multidetector CT evaluation of total anomalous pulmonary venous connections: comparison with echocardiography. *Pediatr Radiol.* 2009;39:950–4.
3. Kimura LY, Fernandes GSS, Nobrega KTM, et al. Angiotomografia com múltiplos detectores no diagnóstico de drenagem venosa pulmonar anômala: experiência inicial. *Radiol Bras.* 2010;43:347–353.
4. Ho ML, Bhalla S, Bierhals A, et al. MDCT of partial anomalous pulmonary venous return (PAPVR) in adults. *J Thorac Imaging.* 2009;24:89–95.
5. Festa P, Ait-Ali L, Cerillo AG, et al. Magnetic resonance imaging is the diagnostic tool of choice in the preoperative evaluation of patients with partial anomalous pulmonary venous return. *Int J Cardiovasc Imaging.* 2006;22:685–93.
6. Masui T, Seelos KC, Kersting-Sommerhoff BA, et al. Abnormalities of the pulmonary veins: evaluation with MR imaging and comparison with cardiac angiography and echocardiography. *Radiology.* 1991; 181:645–9.