Low-dose dual-source MDCT angiography imaging of partial anomalous pulmonary venous connection in pediatric patients

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Objective: To determine lobar distribution, drainage sites and associated cardiovascular anomalies of partial anomalous pulmonary venous connection (PAPVC) in pediatric patients using 256-detector multidetector computed tomographic (MDCT) angiography.

Material and Methods: 61 cases [27 female, mean age 4.7 years (13 days-15.4 years)] with PAPVC diagnosed by MDCT angiography were included in this study. In all patients, MDCT examinations were performed using a dual-source 256-MDCT scanner (Definition Flash, Siemens Healthcare) with high pitch protocol.

Results: In 61 patients, 73 anomalous pulmonary vein (APV)s were detected, 56 of them (77%) were right sided and 17 (23%) were left. 50 patients (82%) had only one APV, and 11 (18%) had two APVs. In 49 patients with 56 right sided APVs, 38 (%68) draining into superior vena cava, 8 (14%) into atrio-caval junction, 6 (%11) into inferior vena cava, 3 (5%) into right atrium, and 1 (2%) into levoatriocardinal vein. In the 12 patients with 17 left sided APVs, 16 (94%) draining into left innominate vein and 1 (6%) into coronary sinuse. Only 7 (12%) patients had isolated PAPVC, whereas 54 (88%) patients had additional cardiovascular anomalies. The most common (n=40, 66%) associated anomaly is an atrial septal defect (ASD). In patients with right APVs, 26 (53%) had superior sinuse venous type of ASD, 6 (12%) had secundum type ASD, and 3 (6%) had inferior sinuse venousus type of ASD. The other associated cardiovascular anomalies are ventricular septal defect (n=8), persistan left superior vena cava (n=8), patent ductus arteriosus (n=4), aortic coarctation (n=3), hipplastic left heart syndrome (n=2), truncus arteriosus (n=1), double outlet right ventricle (n=1), cor triatrium sinister (n=1), aberrant right subclavian artery (n=1), and levoatriocardinal vein (n=1). In 48 (79%) patients, PAPVC and associated cardiovascular anomalies were corrected surgically. The diagnostic agreements between MDCT and surgical results were %100. The overall mean effective radiation dose was 1.12 mSv (range, 0.15-6.13 mSv), and it was 0.58 mSv (range, 0.15-0.73) in the patients younger than 1 year old.

Conclusion: The presence and course of the anomalous pulmonary veins and associated cardiovascular anomalies can be reliably detected by 256-slice MDCT angiography with lower radiation doses.