

Case 3

Dual Source CT: Pediatric Congenital Heart Disease

By Suzu Kanzaki, MD, Masahiro Higashi, MD, Hiroaki Naito, MD, PhD

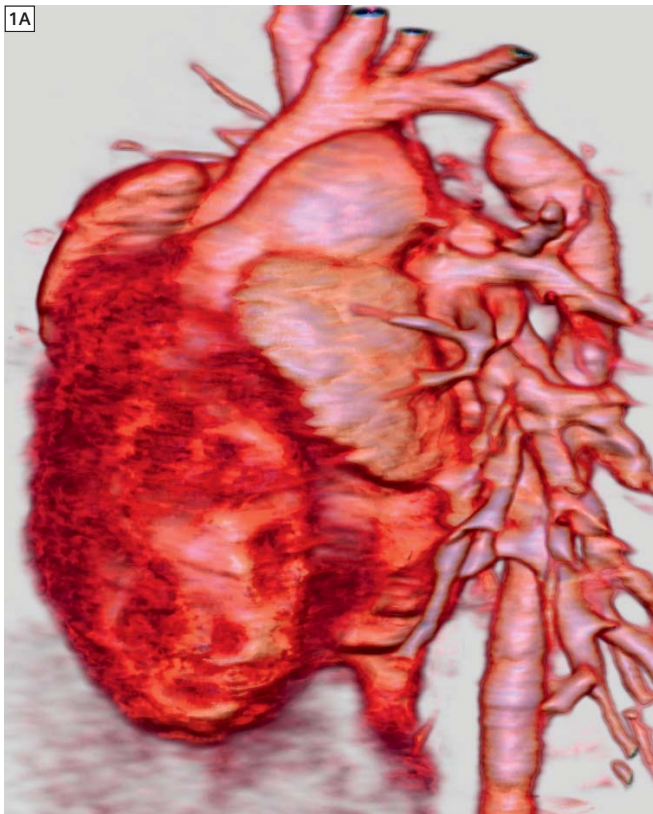
Department of Radiology and Nuclear Medicine, National Cardiovascular Center, Osaka, Japan

HISTORY

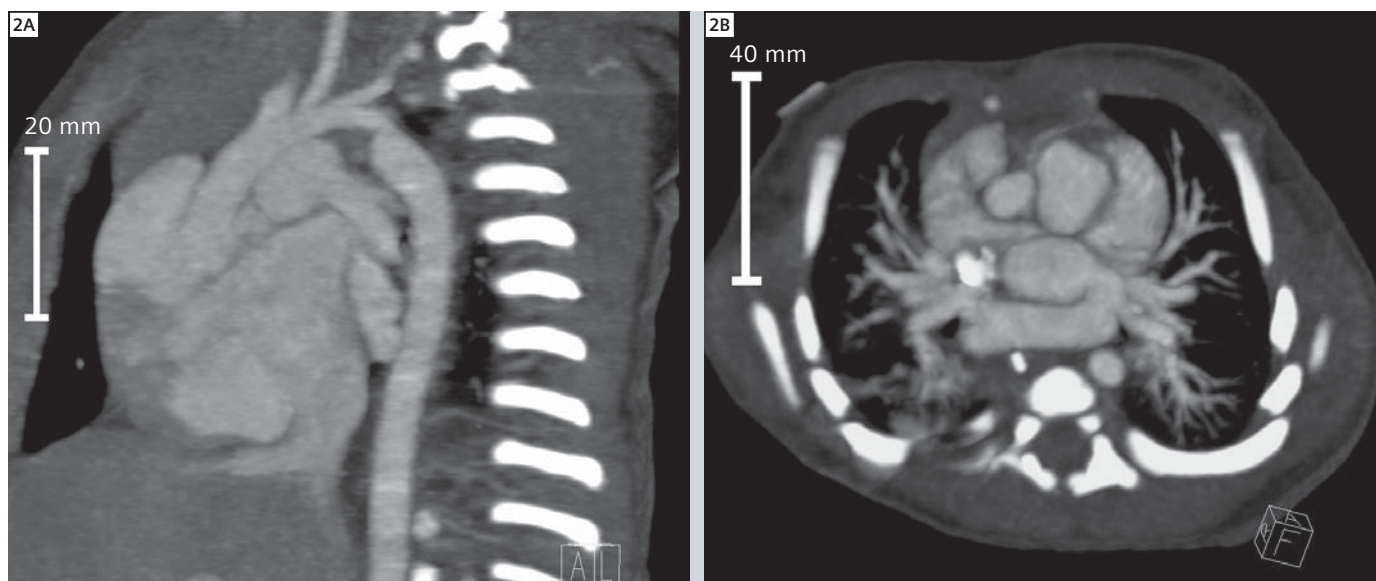
A 10-day-old newborn was referred to the pediatric cardiology department for treatment of his congenital heart disease. Examination by transthoracic echocardiography led to a diagnosis of right isomerism, complex cardiac type of total anomalous pulmonary venous

connection with obstruction, double outlet right ventricle with complete atrioventricular septal defect, coarctation of the aorta and bilateral superior vena cava. An ECG gated cardiac Dual Source CT scan was taken to help confirm the diagnosis.

The patient's height was 43.5 cm, body weight was 2.4 kg, and mean heart rate during the scan was 142 bpm. Due to the fast scan time of only 3 seconds, he had to be sedated only by oral medication before the scan.



1 Volume rendered display of the pediatric cardiac scan reveals aortic coarctation (Fig. 1A) and a complex cardiac type of anomalous pulmonary venous connection even at a mean heart rate of 142 bpm (Fig. 1B).



2 Maximum Intensity Projection (MIP) of the aortic coarctation (Fig. 2A) and double outlet right ventricle (Fig. 2B).

DIAGNOSIS

The aortic coarctation and the anomalous pulmonary venous connection to the abnormal site of the atrium are shown in the DSCT (Dual Source CT) images above. DSCT could confirm the morphologies of these great vessels, which were difficult to discern by echocardiography alone. The morphology of the cardiac chambers was also well detected as diagnosed by echocardiography. Based on these findings, palliative surgical correction was planned.

COMMENTS

The Dual Source CT images were of diagnostic quality despite the small size of the patient's heart and despite his high heart rate of 142 bpm. The patient could not hold his breath, but scan time was short enough to suppress the influence of banding artifacts. The high CT im-

age quality made precise surgery planning possible. This scan was performed shortly after installation of the Dual Source CT at the radiation center. With more experience, it's possible to reduce the dose to pediatric patients by about 2/3.

EXAMINATION PROTOCOL

Scanner	SOMATOM Definition
Scan area	thorax
Scan length	80 mm
Scan time	3 s
Scan direction	cranio-caudal
Tube voltage	100 kV
Tube current	280 mAs
Rotation time	0.33 s
Spatial resolution	0.33 mm
Slice collimation	0.6 mm
Reconstructed slice thickness	0.6 mm
Increment	0.5 mm
Kernel	B25f