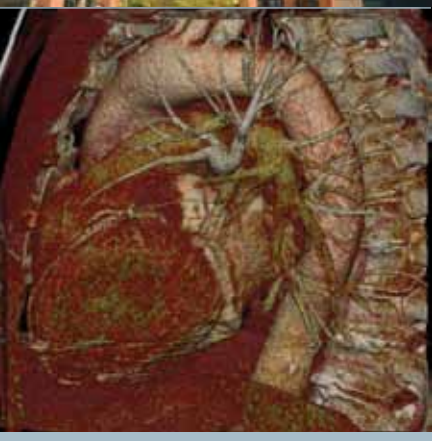

University Hospitals of Cleveland/ Case Medical Center

Providing Essential, Low-Dose Pediatric Imaging

Case Study

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SIEMENS

“Complex heart disease imaging is a complex combination of successful noninvasive CT imaging with important dose reduction. The Definition enables this combination.”

Robert Gilkeson, MD
Department of Radiology
University Hospitals of Cleveland

University Hospitals™

University Hospitals (UH) is a community-based healthcare system that serves patients at more than 150 locations throughout Northern Ohio, including seven wholly owned and four affiliated hospitals.

Committed to advanced care and advanced caring, UH encompasses the region’s largest network of primary care physicians, outpatient centers, and hospitals. The network also offers specialty care physicians to treat almost every disease and condition, skilled nursing, elder health, rehabilitation and home care services, and occupational health and wellness. University Hospitals is the second largest private-sector employer in Northeast Ohio and is within the top five largest private-sector employers in the state of Ohio.

The Rainbow Babies & Children's Hospital of the University Hospitals has been known as the #1 institution for pediatric care in the Midwest for many years and belongs to the Top 5 pediatric hospitals in the country.

Traditionally, the neonatal intensive care unit has the best references in the country. Rainbow doctors are all leaders in their fields; nurses, practitioners, and other specialists are all experts in their specialties. They are highly trained in how to help kids and dedicated to ensuring best possible outcomes.

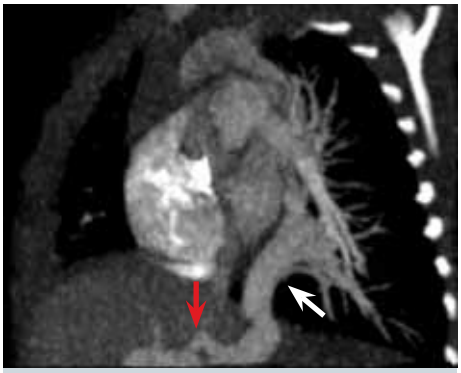
With Siemens MRI and CT solutions, hundreds of pediatric and neonatal congenital heart examinations are performed with low-dose protocols throughout the year. Most patients are imaged without sedation. Images are routinely used for preoperative surgical planning.

Pediatric Case Study #1

History
- 10-day-old premature infant with echocardiogram suspicious for total anomalous pulmonary venous drainage.
- The echocardiographic views were limited, and a three-dimensional evaluation of the anomalous venous anatomy was needed prior to surgery.

Examination Protocol
- Heart Rate 136 bpm
- 100 kV
- 10 mAs/rot
- Retrospective ECG gating with MinDose®
- CARE Dose4D™
- DLP: 9 mGy x cm

Diagnosis
Given the delineation of the anomalous venous anatomy on Dual Source CT, successful surgical redirection of the anomalous pulmonary veins to the left atrium was performed.



Sagittal MIP image demonstrates anomalous drainage of the left-sided pulmonary veins below the diaphragm to the portal vein (white arrow). Note: narrowing of the anomalous pulmonary vein where it enters the portal vein (red arrow).

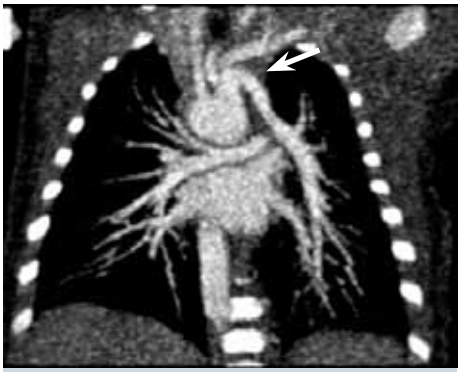
Pediatric Case Study #2

History
- 2-week-old infant with an extremely rare form of truncus arteriosus. Prior echocardiography was inconclusive for evaluation of truncus arteriosus anatomy.
- The aorta and right pulmonary artery formed a common trunk. The left pulmonary artery could not be identified.
- A CT angiogram was performed to delineate the truncal anatomy and define the right pulmonary artery.

Examination Protocol
- Heart Rate 145 bpm
- Hand injected 3cc/kg contrast
- 80 kV
- 20 mAs/rot
- Retrospective ECG gating with MinDose®
- CARE Dose4D™
- DLP: 9 mGy x cm

Diagnosis
With the accurate delineation of aortic and pulmonary artery anatomy with Dual Source CT, the surgeon successfully reconstructed the aorta and pulmonary arteries.

Axial MIP images demonstrate common truncal origin of the aorta and unusual posterior course of the right pulmonary artery.



Coronal MIP image demonstrates origin of left pulmonary artery from the aortic arch.

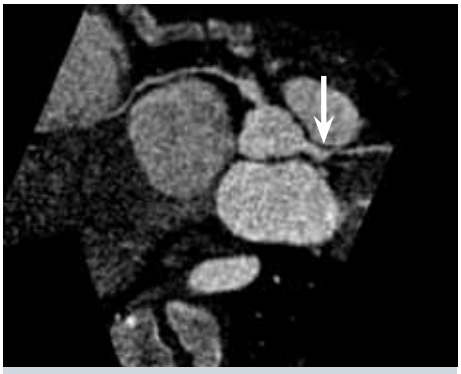
Pediatric Case Study #3

History
- 2-year-old with history of Kawasaki disease and coronary artery aneurysms. The cardiologist requested a noninvasive imaging test to further evaluate the patient's known coronary artery aneurysms.
- The CT imaging results noninvasively defined the bilateral coronary artery aneuyms.

Examination Protocol
- Heart Rate 92 bpm
- 100 kV
- 26 mAs/rot
- Retrospective ECG gating with MinDose®
- CARE Dose4D™
- DLP: 27 mGy x cm

Diagnosis
The diagnostic nature of CTA precluded the need for future invasive catherization.

Sagittal MIP image demonstrates right coronary artery aneurysm.



Axial MIP image redemonstrates aneurysms of the right and left coronary arteries.

Pediatric Case Study #4

History
- 33-week premature infant with Tetralogy of Fallot and right aortic arch.
- Questionable vascular ring on echocardiogram.
- CT performed to evaluate possible vascular ring.

Examination Protocol
- Heart Rate 134 bpm
- 100 kV
- 16 mAs/rot
- Retrospective ECG gating with MinDose®
- CARE Dose4D™
- DLP: 9 mGy x cm

Diagnosis
The CT provided a noninvasive diagnostic evaluation of unusual ductal flow from the aortic arch to the main pulmonary artery (arrow), not a vascular ring. This unusual ductus was successfully resected with a definitive Tetralogy of Fallot repair.

CTA of the chest with IV contrast.

Technology & Innovations for Pediatric Care

Installed: SOMATOM Definition™ Dual Source CT

The idea behind Dual Source CT is simple:

It is merely using two X-ray sources and two detectors at the same time.

The result?

You get double temporal resolution, double speed, and twice the power, while lowering dose even further.

It provides images of exceptional quality and is an amazing tool to explore new clinical opportunities. The benefits Dual Source CT holds for you and your patients are astounding. SOMATOM Definition allows you to scan any heart at any heart rate without the need of beta-blockers — at the lowest radiation dose ever achieved in CT.

Moreover, it provides one-stop diagnoses regardless of size, condition, and heart rate of the patient, saving precious time and money in acute care. And, imagine all the additional clinical opportunities spiral dual energy scanning offers in CT by characterizing materials in a single scan.

Two STRATON® X-ray Tubes	30 MHU, 5 MHU/min anode cooling rate
Dual Source Ultra-Fast Ceramics (UFC)	Detector Assemblies with 0.6 mm and 1.2 mm collimation
z-Sharp™ Technology with STRATON Tube	Enabling 0.33 mm isotropic resolution and 0.33 msec rotation speed for standard 83 msec temporal resolution for cardiac scanning for advanced and routine imaging
Operating System	*syngo*® – Microsoft Windows®-based common Siemens interface
***syngo* Dual Energy**	For simultaneous acquisition and processing of two different energy levels
Data Storage	Image storage: 2 x 146 GB for 520,000 images, CD-RW and DVD-R Raw data storage: 750 GB
Image Reconstruction Performance	Up to 40 images per second
WorkStream4D	For direct 3D reconstructions from raw data and streamlined postprocessing
CARE Dose4D	Real-time dose modulation
CARE Bolus	Automated bolus triggering software
***syngo* HeartView**	With Adaptive ECG-Pulsing, Adaptive Cardio Sequence with arrhythmia detection, automatic best cardiac phase reconstruction, and ECG editing

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