

Dual Source CT of Congenital Heart Disease

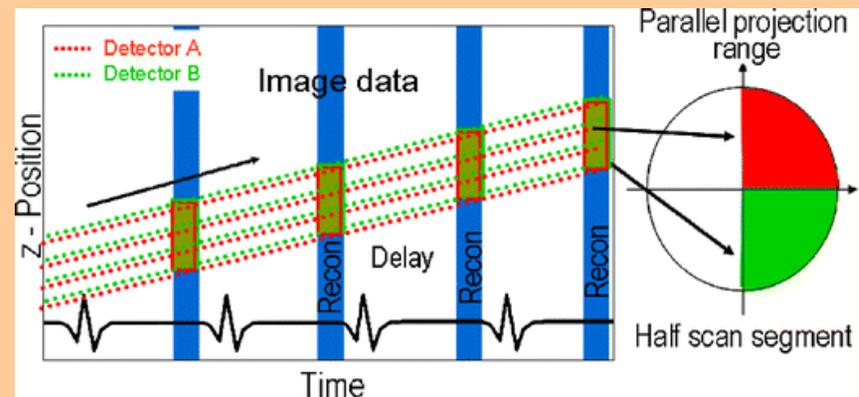
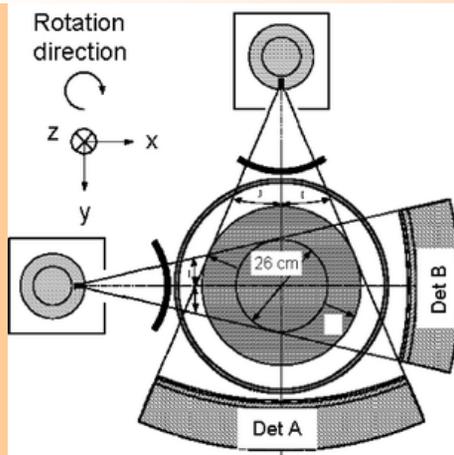
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Benefits of DSCT for Children

High Temporal Resolution (82 msec)

Better Dose Reduction Techniques for ECG-synchronized scan



Dose Reduction Techniques

□ **ECG-gated spiral cardiac CT:**

Efficient ECG-controlled tube current modulation,
Pitch adaptation to the patient's heart rate,
Cardiac shaped-filter, 3D noise reduction
algorithms (B26, B36, B46)

□ **Increased clinical applicability of ECG-triggered sequential CT:**

1/4 – 1/5 of radiation dose of ECG-gated CT

ECG-synchronized Cardiac CT

| Scan Mode | ECG-gated Spiral Scan | ECG-triggered Sequential Scan |
|--------------------------------|-------------------------------------|--|
| Respiration | Breath-hold | Breath-hold or Free Breathing |
| Age of Subject | ≥ 7 Years of Age | No Limits |
| 3D and MPR | Yes | Yes |
| Examination Time | = Scan Time, Shorter (< 10 Seconds) | > Scan Time, Longer, with or without Clustering |
| Contrast IV Injection Protocol | Same as Previous | Increase of Injection Time, Currently No Available Bolus Tracking System |
| Fine Selection of Best Phase | Yes | No |
| Radiation Dose | 3.0 ~ 7.0 mSv | 0.2 ~ 2.0 mSv |

✓ Target Phase: End-systolic > 75 bpm, Mid-diastolic < 75 bpm

ECG-synchronized Cardiac CT

□ **Coronary Artery**

Anomalies, Kawasaki Disease, Coronary Artery Stenosis (*e.g. Post heart transplantation, Supravalvular aortic stenosis...*)

“ No need for β -blocker and routine use of nitroglycerin”

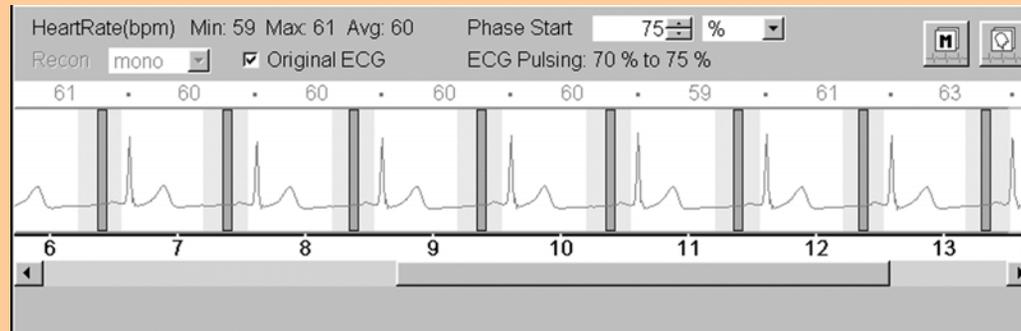
□ **Intracardiac Abnormalities**

Conotruncal or Conoseptal Morphology

ECG-controlled Tube Current Modulation “ECG Pulsing”

□ **Conventional (20% of Full mA) :**

Functional evaluation (e.g. permanent cardiac pacemaker)



□ **MinDose (4% of Full mA):**

Anatomic evaluation

16-slice Non-ECG-synchronized CT



CASE 1 - 19 Y/M
S/P TOF Repair

RCA Arising from Lt Sinus

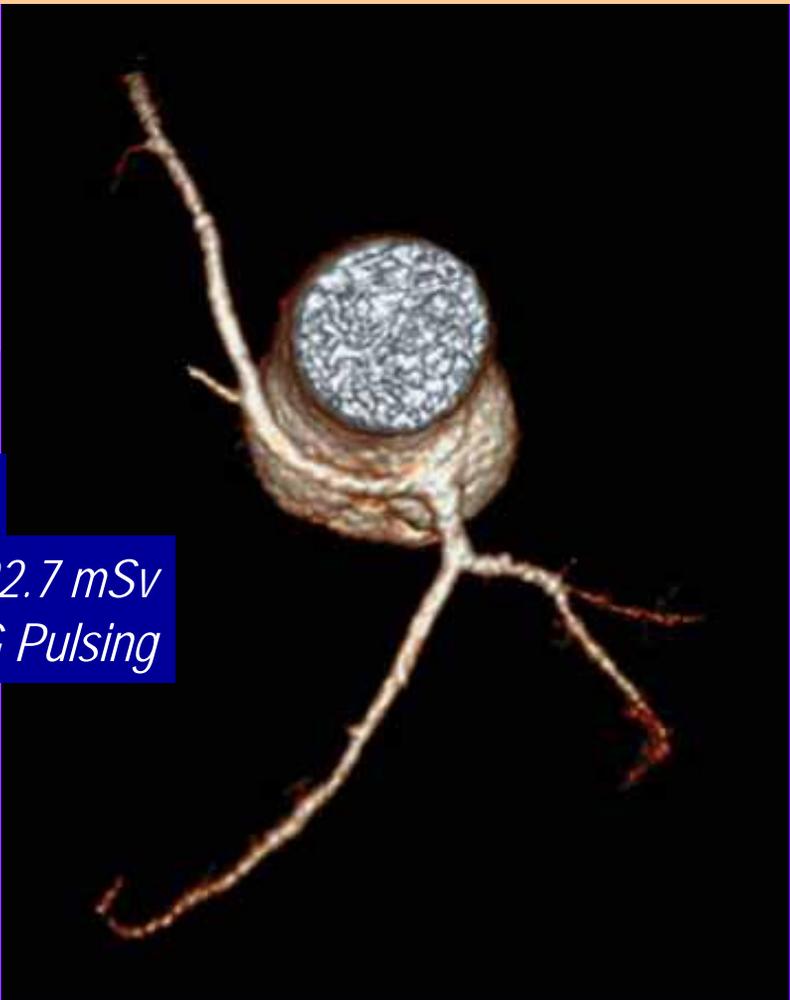
ECG-gated DSCT



59 bpm

22.7 mSv

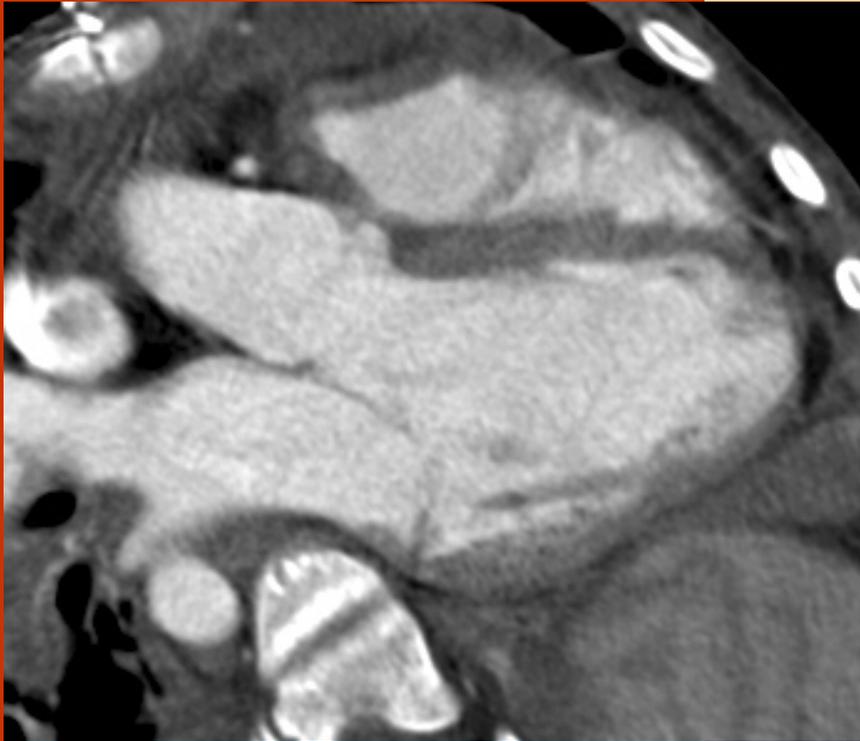
No ECG Pulsing



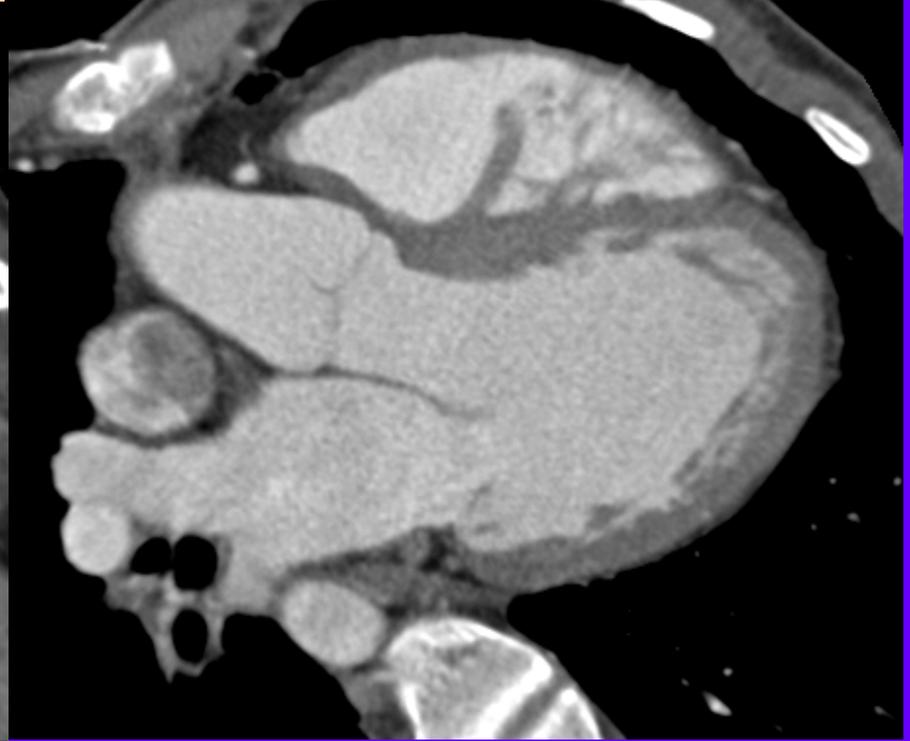
19 Y/M
S/P TOF Repair

LV Myocardial Noncompaction

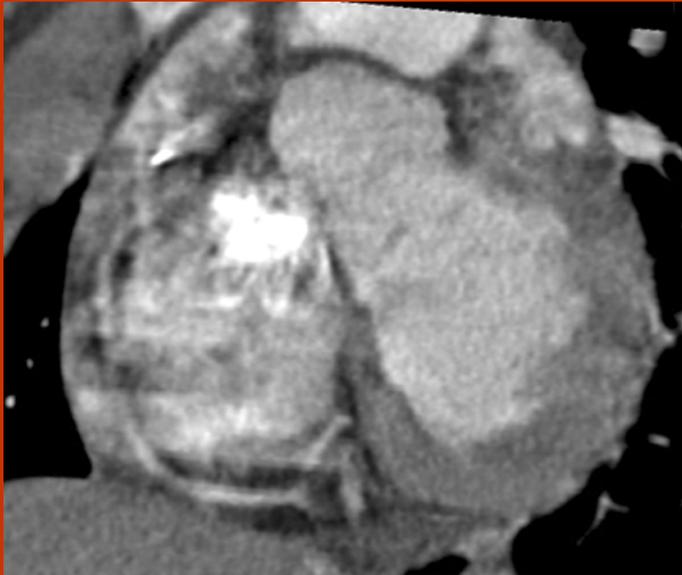
16-slice Non-ECG-synchronized CT



ECG-gated DSCT



16-slice ECG-gated CT



CASE 2 - 19 Y/M
Kawasaki Disease

Aneurysm at Proximal RCA

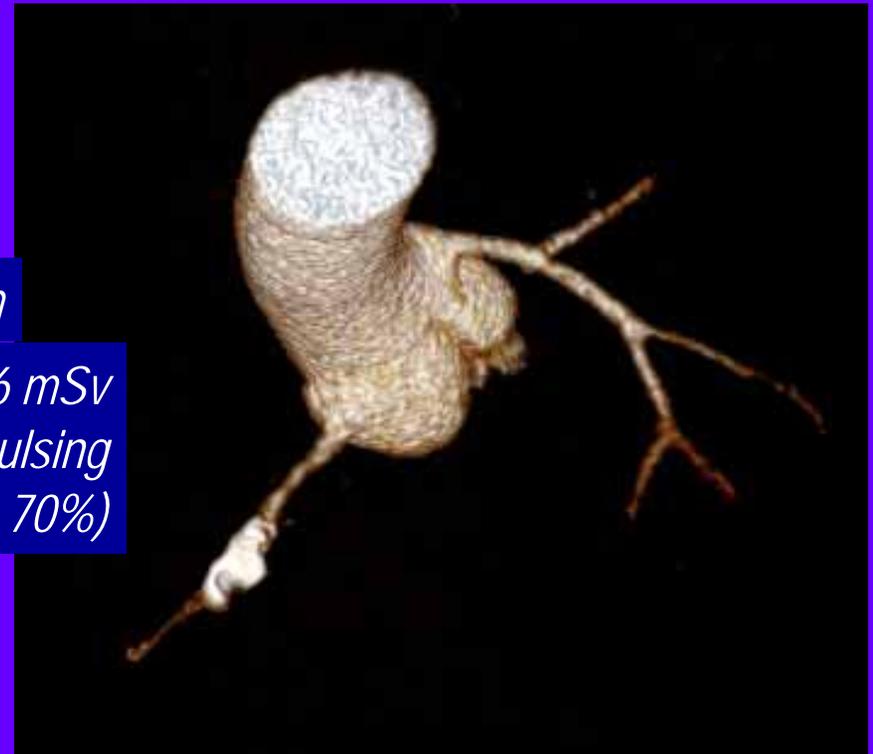
with Obstruction

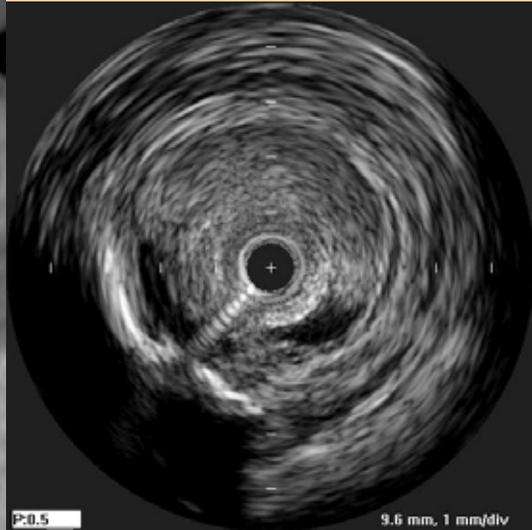
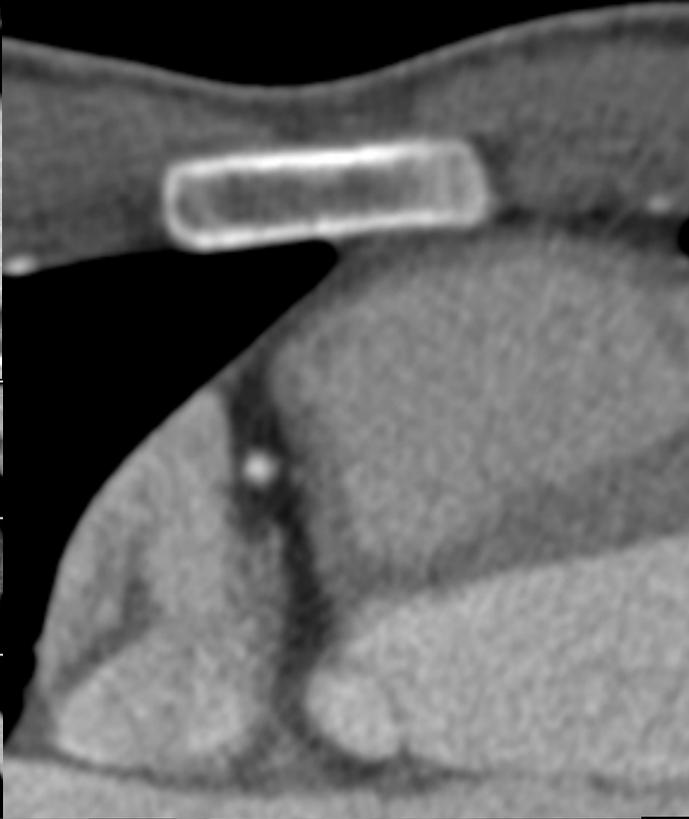
ECG-gated DSCT



67 bpm

13.6 mSv
ECG Pulsing
(30 - 70%)



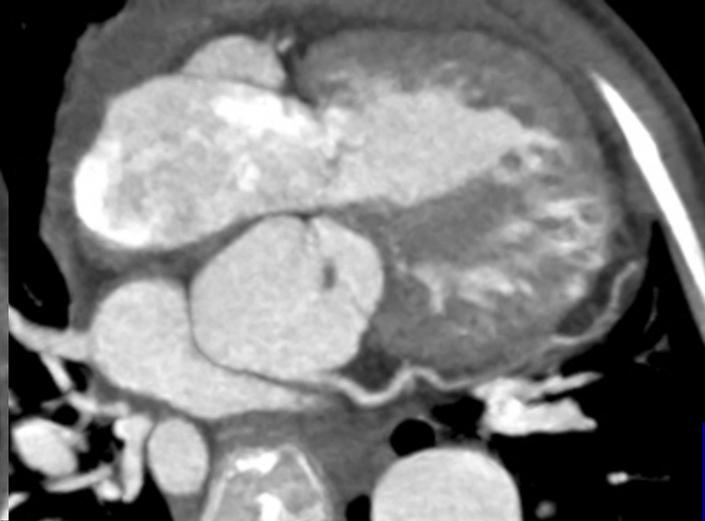


Dose Optimization of DSCT

CASE 3 - 9 Y/F
PA, VSD, MAPCAs

120 kVp, Conventional ECG Pulsing

100 kVp, MinDose

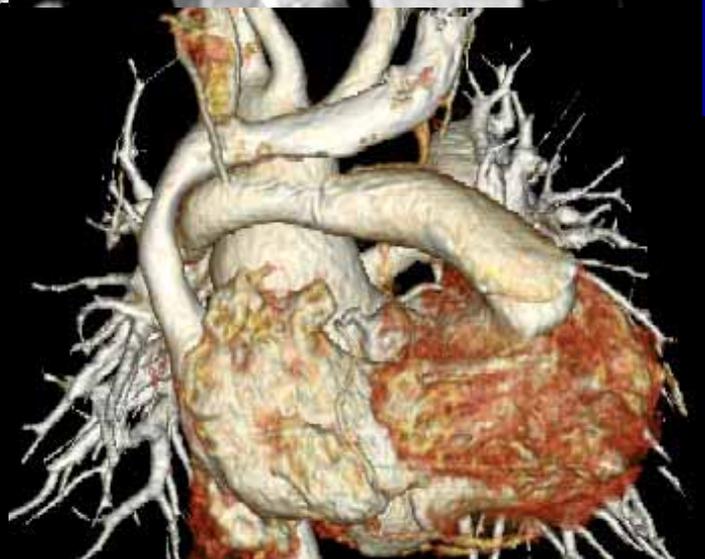
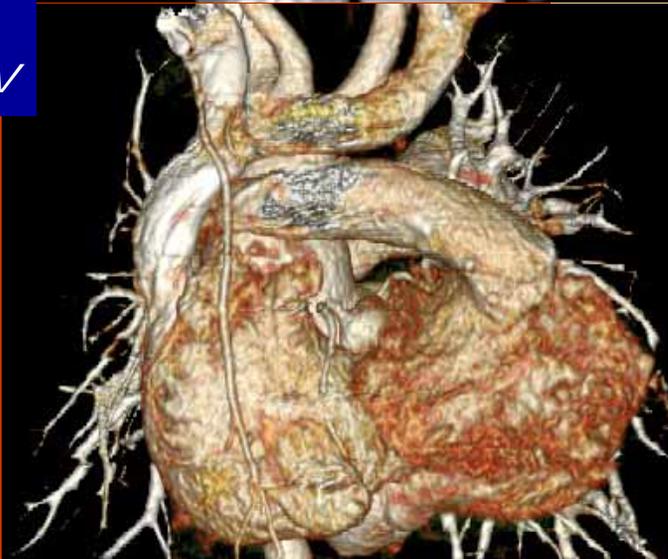


88 bpm

86 bpm

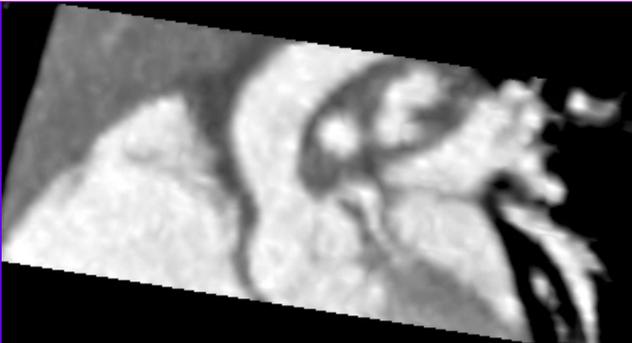
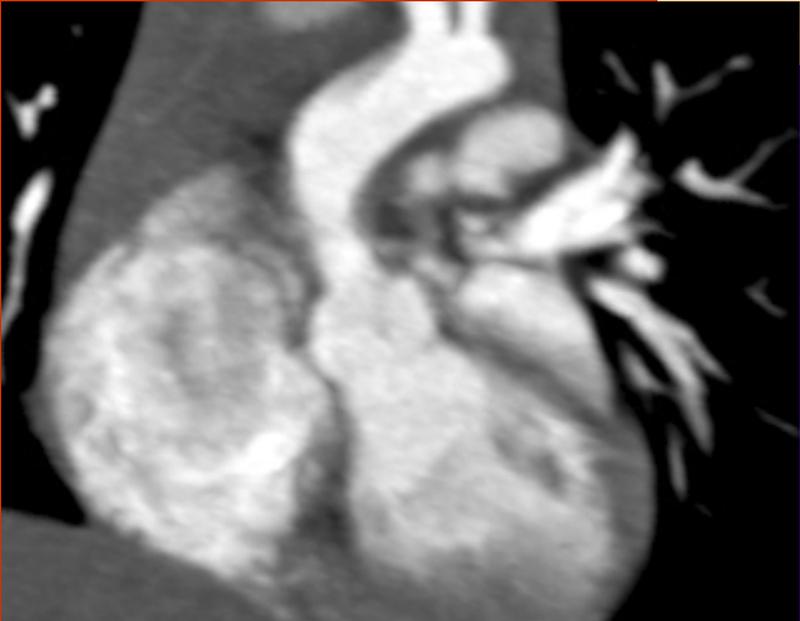
9.2 mSv

3.5 mSv

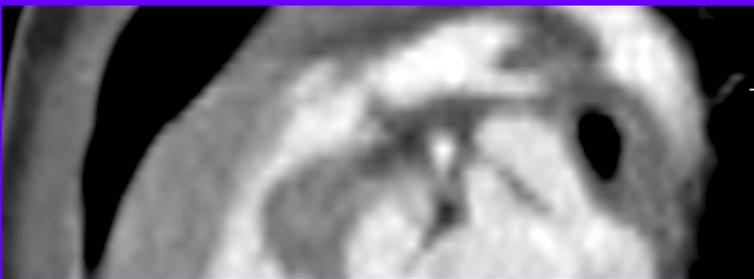


64-slice Non-ECG-synchronized CT

CASE 4 - 9 M/M
R/O William Syndrome



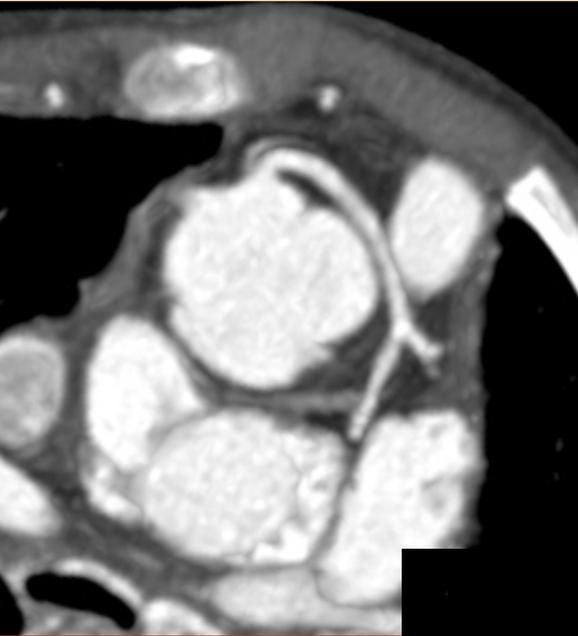
ECG-triggered sequential CT
at End-systolic Phase



147 bpm
1.6 mSv - 0.2 mSv

CASE 5 - 3 Y/M
Coronary Artery Anomalies

ECG-triggered sequential CT
at End-systolic Phase



75 bpm

0.3 mSv

