



# Exceeding expectations

## SOMATOM Definition Edge

International version. Not for distribution in the US.



# A fundamentally changing environment

Expectations of customers are high, when it comes to clinical capability, stability and throughput.

With the SOMATOM Definition Edge, Siemens Healthineers established a scanner that is not only capable to scan virtually every patient and answer every clinical question, but is also capable of exceeding expectations in radiology.

Besides its great flexibility the system has proven to be the right choice, when it comes to high-end imaging no matter, whether it is set to be used for routine diagnostic imaging or high-end cardiac, emergency or oncology settings.

Regardless of clinical field the SOMATOM Definition Edge is exceeding expectations.



*“Our claim is to always exceed expectations of our customers. The SOMATOM Definition Edge is the role model for this aspiration, by everyday exceeding not only clinical, but also stability and throughput expectations.”*

**André Hartung**  
Head of Computed Tomography Business Line  
at Siemens Healthineers



**SOMATOM  
Definition Edge**

# Exceeding expectations

Confronted with increasingly complex clinical requirements and rising numbers of patients, medical institutions are expected to perform at the limits of their capacity every day. Healthcare innovation leader Siemens Healthineers invites them to expand their clinical capabilities – and not only meet, but exceed those expectations.

**Exceeding expectations in Cardiology**, you will be able to expand your clinical capabilities – not only by catching the bolus, but also by improving contrast media efficiency when performing low-kV TAVI planning, introducing highly precise plaque differentiation, and enabling reliable, high-speed triple rule-out scanning.

**Exceeding expectations in Emergency Medicine**, you will be able to optimize process efficiency with solutions that let you not only improve emergency workflow, but also substantially reduce door-to-image time, whether for pediatric or obese patients.

**Exceeding expectations in Oncology**, you will be able to improve patient outcomes not only by precisely identifying tumors, but also by reliably evaluating therapy response and implementing improved low-dose therapy control and early detection.

**SOMATOM Definition Edge** expands your clinical capabilities and helps you and your institution perform to your full potential.

## Contents

- Benefits** ..... 6
- Exceeding expectations in Cardiology ..... 6
- Exceeding expectations in Emergency Medicine ..... 8
- Exceeding expectations in Oncology ..... 10
- Added benefits of *syngo.via* ..... 12
- Clinical Images** ..... 14
- Core Technologies** ..... 36
- Exceeding expectations with the Stellar detector ..... 36
- Exceeding expectations with TwinBeam Dual Energy ..... 38
- Exceeding expectations with the Right Dose ..... 40
- Services ..... 42
- Technical specifications ..... 45

# Exceeding expectations in Cardiology

Expand your institution's clinical capabilities by improving contrast media efficiency in low-kV TAVI planning, introducing precise plaque differentiation, and enabling reliable, high-speed, triple rule-out scanning.

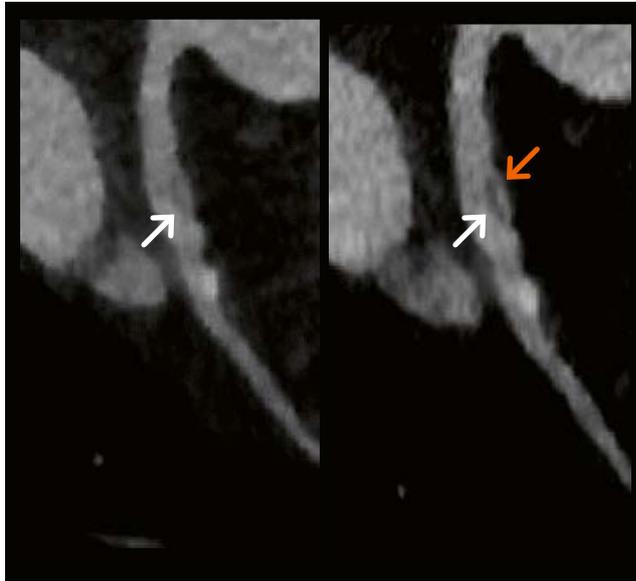
.....  
**Cardiology is one of CT's most challenging fields: Long scan ranges and irregular heart rates meet the need to keep contrast media low, and the dose just right. Covering greater volumes faster, and efficiently optimizing contrast media use, radiation dosage, and tube current, SOMATOM Definition Edge will not only meet, but exceed your expectations in cardiology.**  
.....

## Precise TAVI planning

When a lack of precision can result in underexposed vessels, undiagnostic image quality, and even re-scans, physicians are right to expect new ways of optimizing bolus timing in CT imaging for TAVI planning.

The SOMATOM Definition Edge allows physicians to freely choose the scan speed for ranges of up to 23 cm/s. With the Straton® MX P X-ray tube designed to deliver at voltages as low as 70 kV, the system enables perfect timing along with the bolus, optimizing vessel display with low-kV imaging. In addition,

a perfectly-timed bolus helps optimize the amount of contrast media required, effectively allowing users of SOMATOM Definition Edge to exceed expectations not only with regard to absolute precision, but also in terms of exemplary contrast media efficiency.



Comparison between 0.6 (left) and 0.5 mm (right) slices – advanced plaque differentiation with thinner slices showing fibrocalcified plaque (orange arrow) in 0.5 mm slices.



## Plaque differentiation

With the majority of acute coronary syndromes resulting from plaque rupture and superimposed thrombosis in the setting of a moderate coronary stenosis, radiologists nowadays expect CT technology to help not only in identifying plaque – but also to differentiate plaque, and to help physicians understand the underlying atherosclerotic plaque characteristics and physiologic parameters. Equipped with the first fully integrated Stellar detector, the SOMATOM Definition Edge combines high-speed rotation of up to 0.28 s with the precision of 0.5 mm slices.

Enabling institutions to routinely work with more precise clinical images, the system gives you the opportunity to save time and resources. If you expect identifying plaque via CTA to be a difficult interpretative process, learn how to minimize slice blurring and calcium blooming, reduce cross-talk and increase cross-plane resolution to 0.30 mm with the SOMATOM Definition Edge – and get ready to have your expectations exceeded.

## Reliable triple rule-out scanning

In coronary CTA acquisition, higher heart rates and heart rate variation can result in inappropriate data sampling, severe motion artifacts, and often unacceptably high radiation exposure. That's why physicians expect CT technology to include a heart rate adaptive optimization of spatial and temporal resolution to minimize or, ideally, avoid motion artifacts. The SOMATOM Definition Edge meets and exceeds these expectations: Intelligently combining its 0.28 s rotation and flying focal spot with z-Sharp, the system is able to maintain its outstanding spatial resolution even at a high temporal resolution of 142 ms – across the entire relevant cardiac field of view.

# Exceeding expectations in Emergency Medicine

Increase your institution's process efficiency and substantially reduce door-to-image time by introducing excellent emergency care for all patients, and establishing future-ready, high-efficiency workflows.

.....  
**Emergency scanning has to cover the whole range, from pediatric to bariatric patients. When the goal is to provide fast and reliable diagnoses, patient exclusion has to be avoided by all means – a fast and reliable workflow for optimum quality images for every patient is key. Exceed expectations in emergency medicine with the SOMATOM Definition Edge.**  
.....

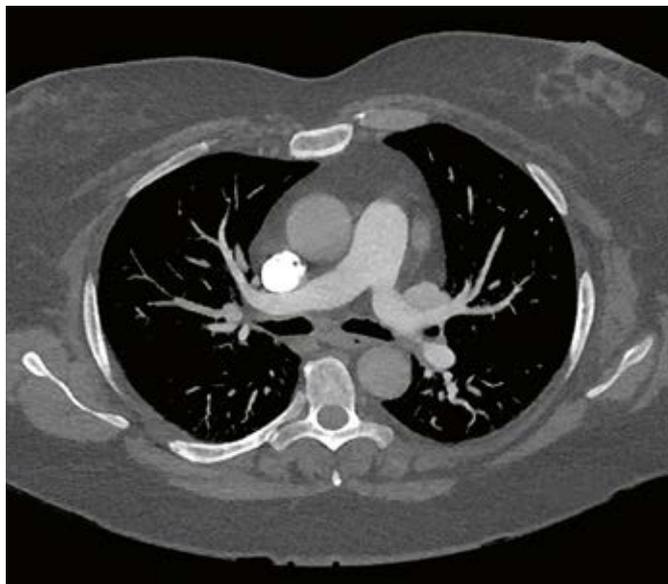
## **Pediatric imaging**

Challenges in emergency scanning start with the smallest patients: Pediatric patients. Featuring CARE Child – a unique combination of 70 kV imaging with dedicated pediatric protocols – the SOMATOM Definition Edge helps clinicians decide whether or not to scan the most dose-sensitive cases. With a pitch of up to 1.7, and scan speeds of up to 23 cm/s, the system enables fast pediatric scanning without dose discussions, with no compromise on image quality, and keeps sedation minimized.

## **Bariatric imaging**

With more and more patients suffering from obesity, the capacity to deliver sound bariatric imaging is essential. In emergency medicine, having to send patients to other facilities because the on-site imaging devices cannot cope with them is a worst-case scenario. In addition to the technical considerations, these patients usually suffer from short breath, and are often unable to hold a certain position for a very long time. They also have the highest X-ray attenuation, which places a high demand on a scanner's detector technology. In short, healthcare providers risk generating bad or even non-diagnostic images when they examine bariatric patients.

Even obese patients  
(in this case 143 kg)  
can be scanned  
at full rotation of  
0.28 s and a pitch of  
1.7 for minimized  
breath-hold.



The SOMATOM Definition Edge, with its large bore of 78 cm and a patient load capacity of up to 307 kg, has been designed to overcome these challenges and avoid excluding these patients. An acquisition speed of 23 cm/s minimizes breath-hold times and with its unique combination of the renowned Straton® MX P X-ray tube, power reserves of up to 100 kW and 800 mA, and the Stellar detector – which was specifically developed to handle very low X-ray signals – the SOMATOM Definition Edge offers the ideal imaging chain to diagnose large patients.

### **Be FAST. Take CARE.**

When every second counts, efficient routine workflows have to be in place. Operators should not have to worry about setting scan parameters or preparing reconstructions, but should be spending their time with the person at the center of it all – the patient. Here, FAST CARE technology makes time-consuming and complex procedures faster and more intuitive. FAST Spine enables the accurate and automatically aligned preparation of spine recons with just a single click. FAST 3D Align enables the automated alignment of FOV, adjustments and reconstructions of standard views. Scanning becomes more reproducible and less prone to errors.

### **Reducing metal artifacts**

In addition to time constraints and complicated preparations, emergency care imaging often suffers from metal artifacts diluting image quality. If patients are uncooperative or unconscious, clarification about whether or not metal implants are present is often not possible. The resulting metal artifacts can obstruct relevant anatomies or pathologies for the diagnoses, and potentially lead to incorrect treatment decisions. The SOMATOM Definition Edge offers an innovative solution: iterative Metal Artifact Reduction (IMAR) combines fast reconstruction speed with easy workflow integration – and is guaranteed to exceed expectations for your clinical routine in the ER.

# Exceeding expectations in Oncology

Optimize your patient outcomes by introducing early tumor identification, fast, easy, and reliable therapy response assessment, and improved, low-dose therapy control.

.....  
**Computed tomography is an important imaging tool in routine clinical oncology, especially for CT-guided interventions, follow-up scans during treatment procedures, and control scans. And the more that technological innovation helps to increase reliability and dose-efficiency, the greater its role will become for preventive care as well: Exceeding expectations with the SOMATOM Definition Edge.**  
.....

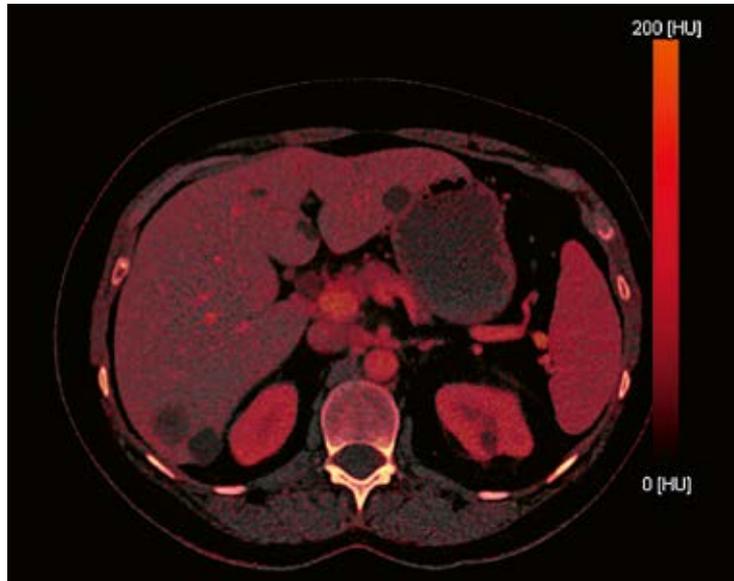
## Early detection and sustainable therapy

The key to successful treatment in oncology is identifying and characterizing tumors at a very early stage. Consequently, one of the most debated topics in oncology today is CT-based preventive care, i.e. low-dose lung imaging for early tumor detection. The Stellar detector, the latest introduced Tin Filter technology and high-end iterative reconstruction tools like SAFIRE and ADMIRE, enable scans with diagnostic image quality at dose levels that seemed unthinkable only a few years ago. The SOMATOM Definition Edge delivers on what you would expect of routine oncology imaging – and exceeds expectations by preparing your clinical portfolio for the future.

## Reliable therapy response assessment

Tumor detection is one thing – deciding on the appropriate treatment and assessing therapy success is another. After all, whether the tumor is treated with minimally invasive procedures, with surgery, or with new personalized medicine, physicians need to see whether or not the tumor has been completely removed, if it is still vital, and how it is responding to expensive therapeutic drugs. Traditionally, monitoring the disease in this phase was rather extensive, and often required multiple CT scans, e.g. combining images with and without contrast media.

TwinBeam Dual Energy acquires body imaging at two different energy levels in a single scan. The characters of the multiple hepatic lesions can be clearly differentiated using Liver VNC.



## Low-dose therapy control for all patients

The SOMATOM Definition Edge with TwinBeam Dual Energy can do it all in one scan – and deliver diagnostic information beyond what is expected of CT imaging. The scan mode enables the reconstruction of a virtual non-contrast image, and allows for the precise quantification of iodine uptake in the tumor. As a result, both diagnostic quality and confidence are improved and stabilized, and tumor evaluation can be carried out faster, easier, and more reliably than ever before.

Following up on therapy success usually takes a significant amount of time requiring several additional examinations. As consecutive scans can lead to high dose accumulations over time, not only do dose reduction and treatment quality become essential, but so too does patient satisfaction. When inefficiencies eventually result in lower revenue or higher costs, institutions are well advised to look for a system that combines innovative clinical capabilities, patient focus, and outstanding efficiency. A system that exceeds the expectations of both patients and professionals.

# Added benefits of *syngo.via*

Regardless of volume or disease, *syngo.via* helps prepare cases, eases interdisciplinary collaboration, and helps generate a faster and more reliable diagnosis.

## Get the most out of your images

.....  
*syngo.via*<sup>1</sup> is the intelligent imaging software for multi-modality reading that helps you master growing amounts of imaging data in less time. In short: *syngo.via* is reading as it should be.  
.....

Whether you look at CT, MI or MRI images, read mammography or prepare for radiation therapy, with *syngo.via*, you read your cases regardless of modality in one place. There is no need to switch workstations. *syngo.via* is the intelligent software that brings together the imaging information you need to make a clear decision.

## See what's relevant

When you open a case in *syngo.via*, you immediately see the information relevant to you. *syngo.via* works with intelligent anatomy recognition, images are mapped and aligned based on anatomical landmarks, so you can start reading straight away.

## Deliver to the point

*syngo.via* reports are clearly arranged and enriched by images such as photo-realistic Cinematic VRTs<sup>2</sup>, trendings, and actionable data. This supports your colleagues' medical decision-making. *syngo.via* can easily be integrated into existing information systems – simplifying the distribution of results inside and outside of your department.

Cinematic VRT<sup>2</sup> provides a photorealistic rendering of shapes, scattering and depth. This promotes a much faster understanding of spatial anatomical structures, and the presentation of a virtual human anatomy that almost explains itself.



*syngo.CT Bone Reading* revolutionizes rib and spine assessment. The application identifies and labels the ribs and vertebrae, displays the entire rib cage rolled on a 2D planar format and thanks to Rapid Results sends ready-to-read images to the PACS with zero-clicks.

## **syngo.via Cinematic VRT<sup>2</sup>**

### **Make communication with referrers and patients clear and convincing**

With a single click, you can generate in a few seconds photorealistic clinical images just like from an anatomy textbook. Cinematic Rendering is based on a physically accurate simulation of how light interacts with matter. The natural lighting in combination with the accurate simulation of photon scattering and absorption produces photorealistic images that resemble many shading effects that can be observed in nature, such as soft shadows, ambient occlusion, volumetric scattering and subsurface photon interaction. This promotes easier interpretation of complex anatomical structures, that you can use for education, publication, and communication – especially with your referrers and patients.

## **Why waste time in CT post-processing?**

### **Rapid Results improves your efficiency by reducing your workflow steps**

Rapid Results enables direct communication between *syngo.via* and SOMATOM CT scanners, triggering zero-click post-processing within the selected scan protocol. In that way, *syngo.via* automatically creates and sends ready-to-read results wherever you are, to your PACS or a film printer. Rapid Results knows what you need, just when you need it. This is reading as simple as it should be. Post-processing can be time-consuming, especially in the emergency setting, and the quality of the results often depends on the expertise of the operator. Now with Rapid Results

Technology, you can automatically generate Dual Energy reconstructions, neuro perfusion maps and standard visualizations of general vessels and different anatomies in various types and orientations, for instance an unfolded view of the rib cage and the spine. Define your workflow once and let Rapid Results Technology produce the decision basis in the acute care scenario, whether in severe trauma cases or stroke, or to rule out aortic dissections. Save time in the “golden hour” by automatically creating just the right amount of information – for standardized and reproducible surgical planning.

**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
6.0 s

**Scan length:**  
146 mm

**Rotation time:**  
0.28 s

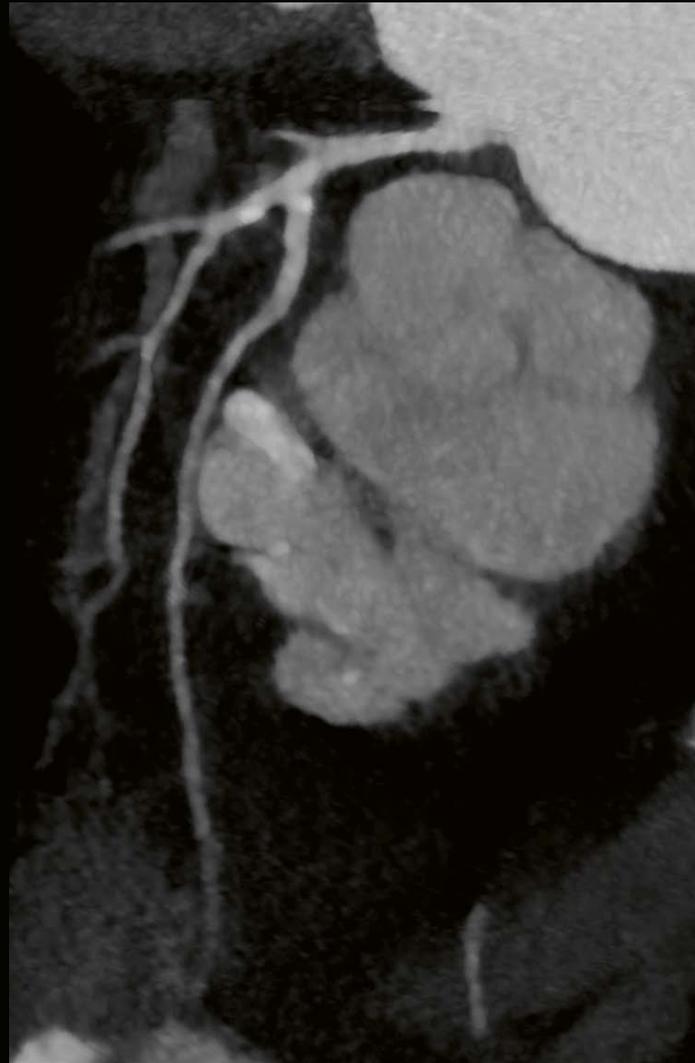
**Tube settings:**  
80 kV, 75 mAs

**CTDI<sub>vol</sub>:**  
4.38 mGy

**DLP:**  
72.65 mGy cm

**Eff. dose:**  
1.0 mSv

**Heart rate:**  
67 bpm

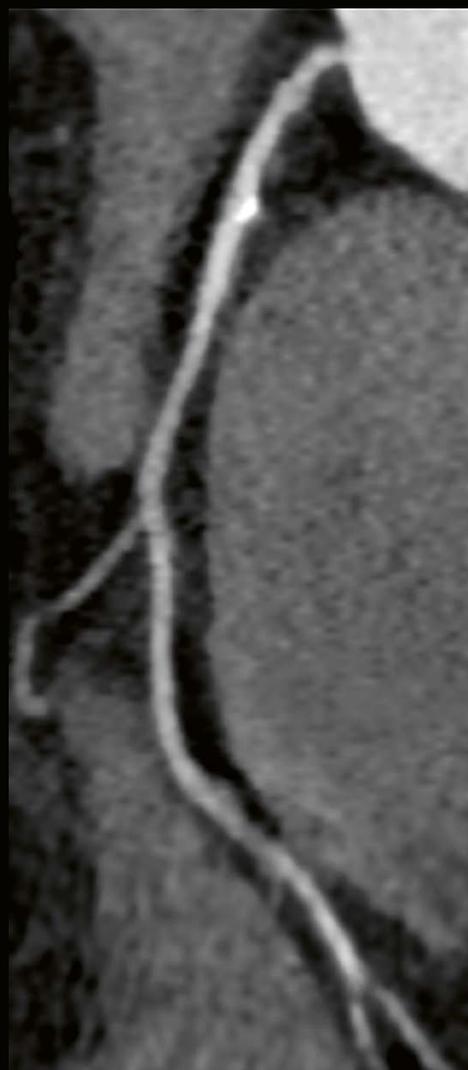
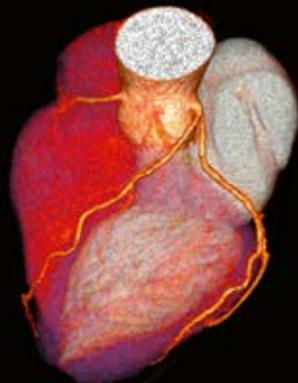
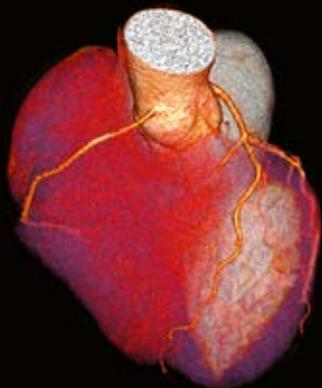


0.5 mm



0.6 mm

**Soft and fibrocalcified plaques in the LAD –**  
Routinely high rotation speed, combined with Edge technology and 0.5 mm slices, delivers additional diagnostic information for more precise plaque differentiation.



**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
3.7 s

**Scan length:**  
137 mm

**Rotation time:**  
0.28 s

**Tube settings:**  
100 kV, 98 mAs

**CTDI<sub>vol</sub>:**  
11.39 mGy

**DLP:**  
179 mGy cm

**Eff. dose:**  
2.5 mSv

**Heart rate:**  
81 bpm

.....

**Coronary plaque imaging at higher heart rate –**  
A rotation speed of 0.28 s and a temporal resolution of 142 ms provide excellent image quality in cardiac imaging even for higher heart rates of more than 80 bpm.

.....

**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
2.5 s

**Scan length:**  
580 mm

**Rotation time:**  
0.28 s

**Tube settings:**  
80 kV, 70 mAs

**CTDI<sub>vol</sub>:**  
2.77 mGy

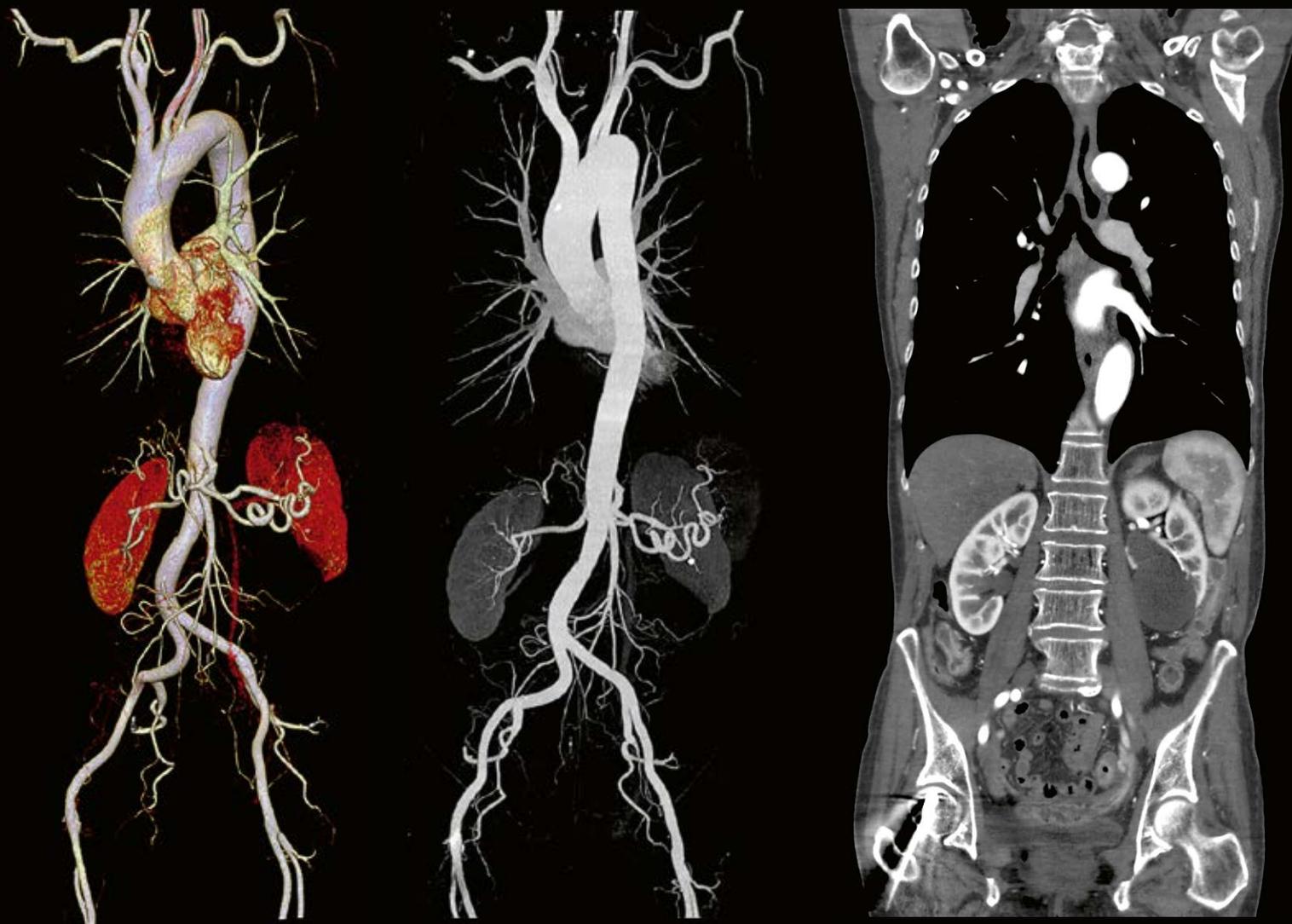
**DLP:**  
172 mGy cm

**Eff. dose:**  
2.49 mSv

**Heart rate:**  
77 bpm



**TAVI planning –**  
An acquisition speed of  
up to 23 cm/s (pitch 1.7)  
boosts contrast media  
efficiency and shortens  
scan times substantially  
in pre-procedural  
TAVI/TAVR planning.



**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
9.0 s

**Scan length:**  
640 mm

**Rotation time:**  
0.5 s

**Tube settings:**  
70 kV, 192 eff. mAs

**CTDI<sub>vol</sub>:**  
2.22 mGy

**DLP:**  
147 mGy cm

**Eff. dose:**  
2.2 mSv

.....

**Aortic CTA –**  
CARE kV automatically sets the right kV for reproducible image quality and enhanced contrast with low kV imaging and reduced dose. In this case using 70 kV.

.....

**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
7.6 s

**Scan length:**  
161 mm

**Rotation time:**  
0.28 s

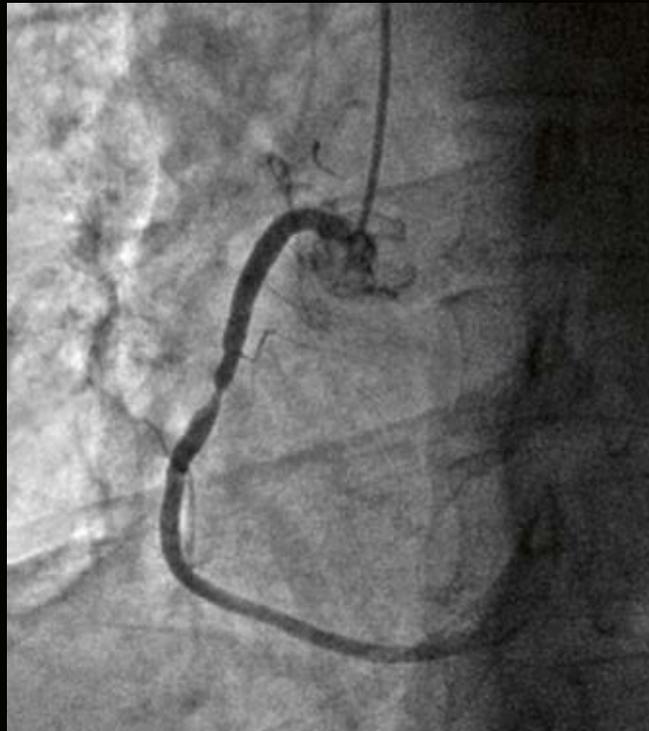
**Tube settings:**  
80 kV, 129 eff. mAs

**CTDI<sub>vol</sub>:**  
7.37 mGy

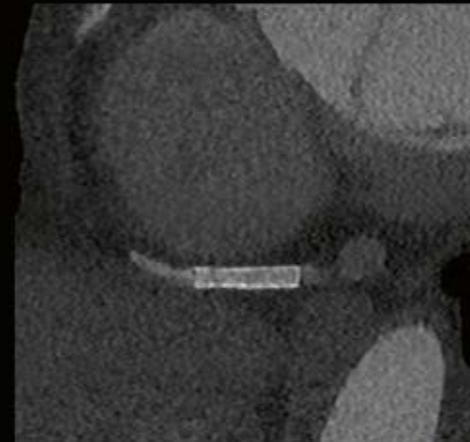
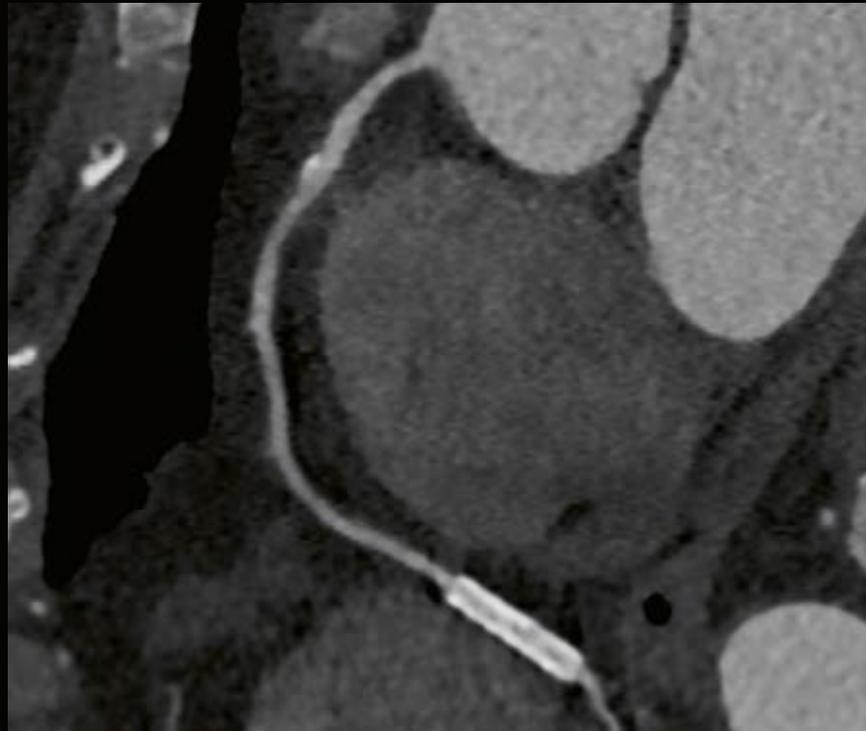
**DLP:**  
133 mGy cm

**Eff. dose:**  
1.862 mSv

**Heart rate:**  
61–70 bpm



.....  
**Stenosis in the RCA –**  
High temporal resolution  
(142 ms) in combination  
with Stellar detector  
delivers diagnostic image  
quality comparable to an  
angiographic image.  
.....



**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
5.0 s

**Scan length:**  
154 mm

**Rotation time:**  
0.28 s

**Tube settings:**  
100 kV, 100 eff. mAs

**CTDI<sub>vol</sub>:**  
13.12 mGy

**DLP:**  
228 mGy cm

**Eff. dose:**  
3.19 mSv

**Heart rate:**  
70 bpm

.....

**Calcified plaque and stent in the RCA –**  
High rotation speed of 0.28 s enables visualization and stent evaluation even in the fastest moving part of the heart. In this case, a small stent in the RCA shows no signs of occlusion.

.....

**Collimation:**  
128 x 0.6 mm

**Scan time:**  
5.0 s

**Scan length:**  
156 mm

**Rotation time:**  
0.28 s

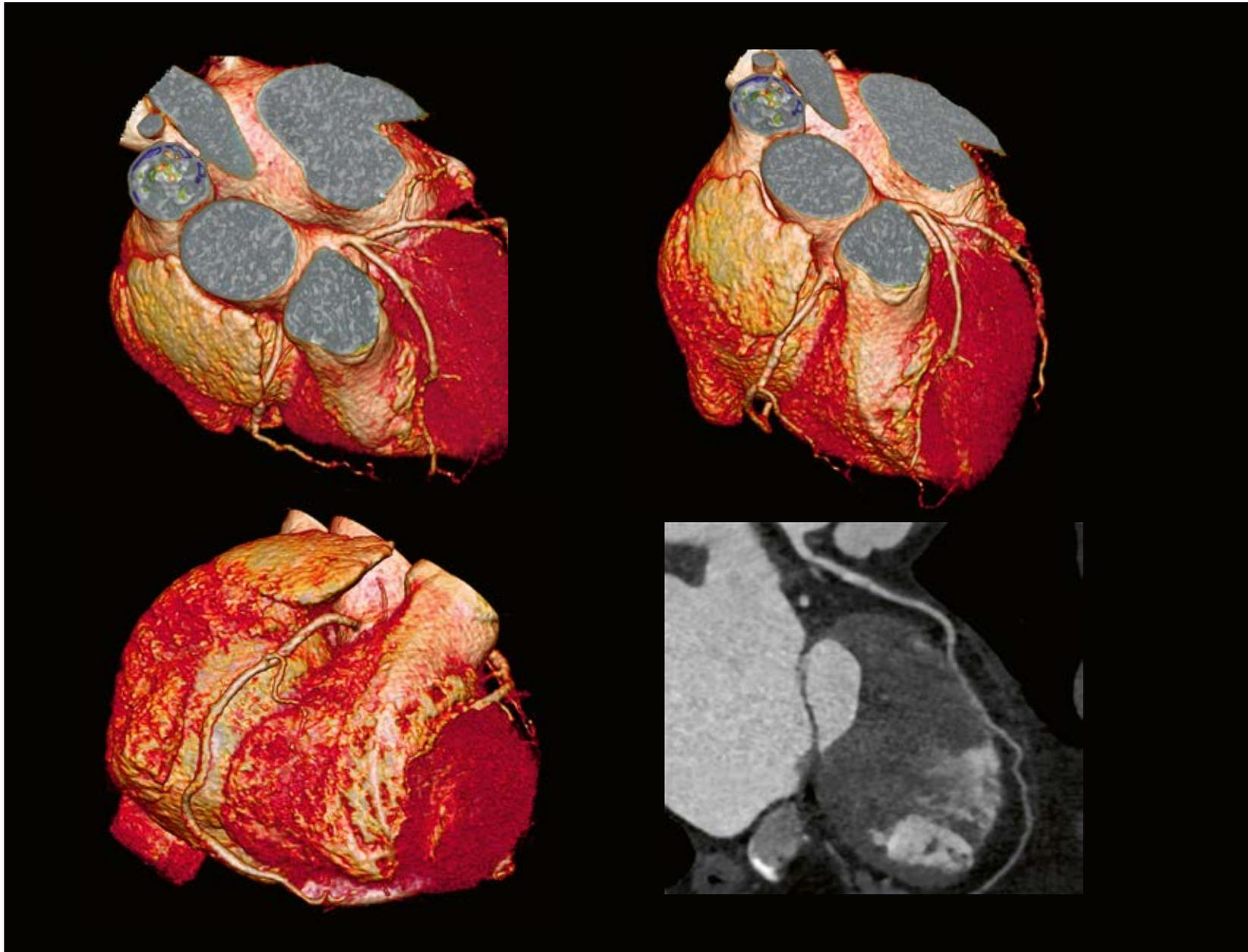
**Tube settings:**  
80 kV, 129 eff. mAs

**CTDI<sub>vol</sub>:**  
8.55 mGy

**DLP:**  
149 mGy cm

**Eff. dose:**  
2.08 mSv

**Heart rate:**  
59–104 bpm



**Myocardial bridge  
in the LAD –**

Higher temporal and spatial  
resolution result in excellent  
image quality at lower dose,  
even with arrhythmia at  
59–104 bpm.



**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
39.0 s

**Scan length:**  
1,221 mm

**Rotation time:**  
1.0 s

**Tube settings:**  
80 kV, 191 eff. mAs

**CTDI<sub>vol</sub>:**  
3.55 mGy

**DLP:**  
446 mGy cm

**Eff. dose:**  
2.5 mSv

.....

**Angio run off –**  
Long-range acquisition at  
low kV shows great vascular  
details at very low dose.

.....

**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
0.6 s

**Scan length:**  
133 mm

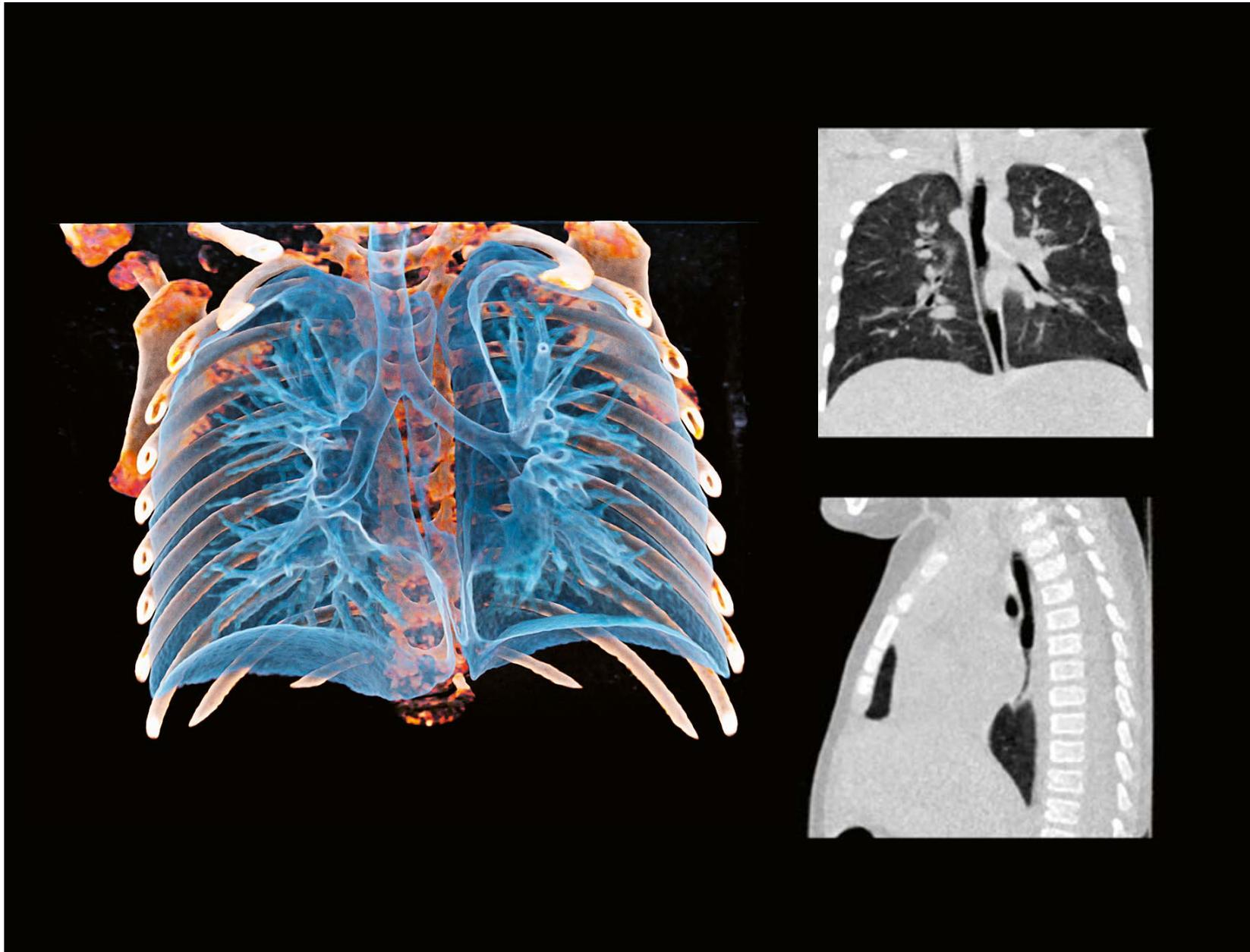
**Rotation time:**  
0.28 s

**Tube settings:**  
100 kV, 4 mAs

**CTDI<sub>vol</sub>:**  
0.14 mGy

**DLP:**  
2 mGy cm

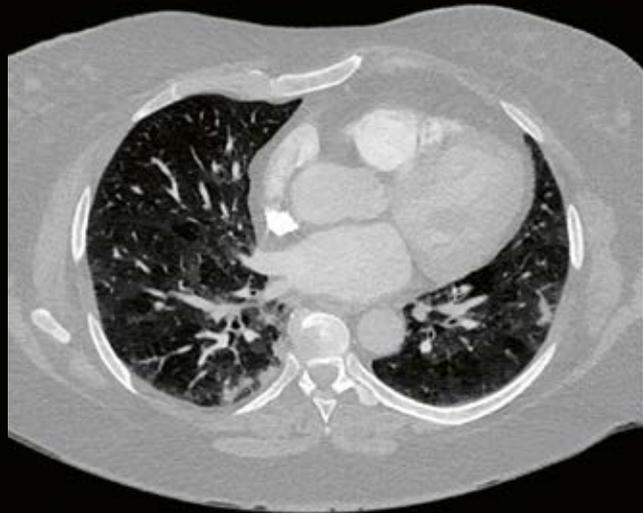
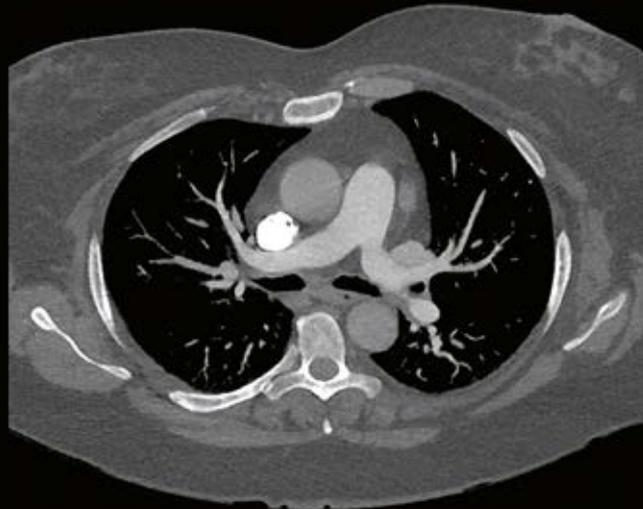
**Eff. dose:**  
0.17 mSv



**Emergency care for pediatric patients –**

The faster pitch (of 1.7) and higher rotation time (of 0.28 s) allow acquisition of diagnostic information at an ultra low dose (DLP 2 mGy cm) in challenging cases, such as this 9-month-old baby with esophagus stenosis. In this case, even without sedation.

Courtesy of Linköping University Hospital, Linköping, Sweden



**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
1.11 s

**Scan length:**  
252 mm

**Rotation time:**  
0.28 s

**Tube settings:**  
120 kV, 130 eff. mAs

**CTDI<sub>vol</sub>:**  
8.83 mGy

**DLP:**  
260 mGy cm

**Eff. dose:**  
3.64 mSv

**Body weight:**  
143 kg

.....  
**Emergency care for obese patients –**  
The outstanding tube and generator power and faster scan speeds (up to 23 cm/s) guarantee an optimal image quality even in challenging cases, such as for obese patients.  
.....

**Collimation:**  
128 x 0.6 mm

**Scan time:**  
12.0 s

**Scan length:**  
170 mm

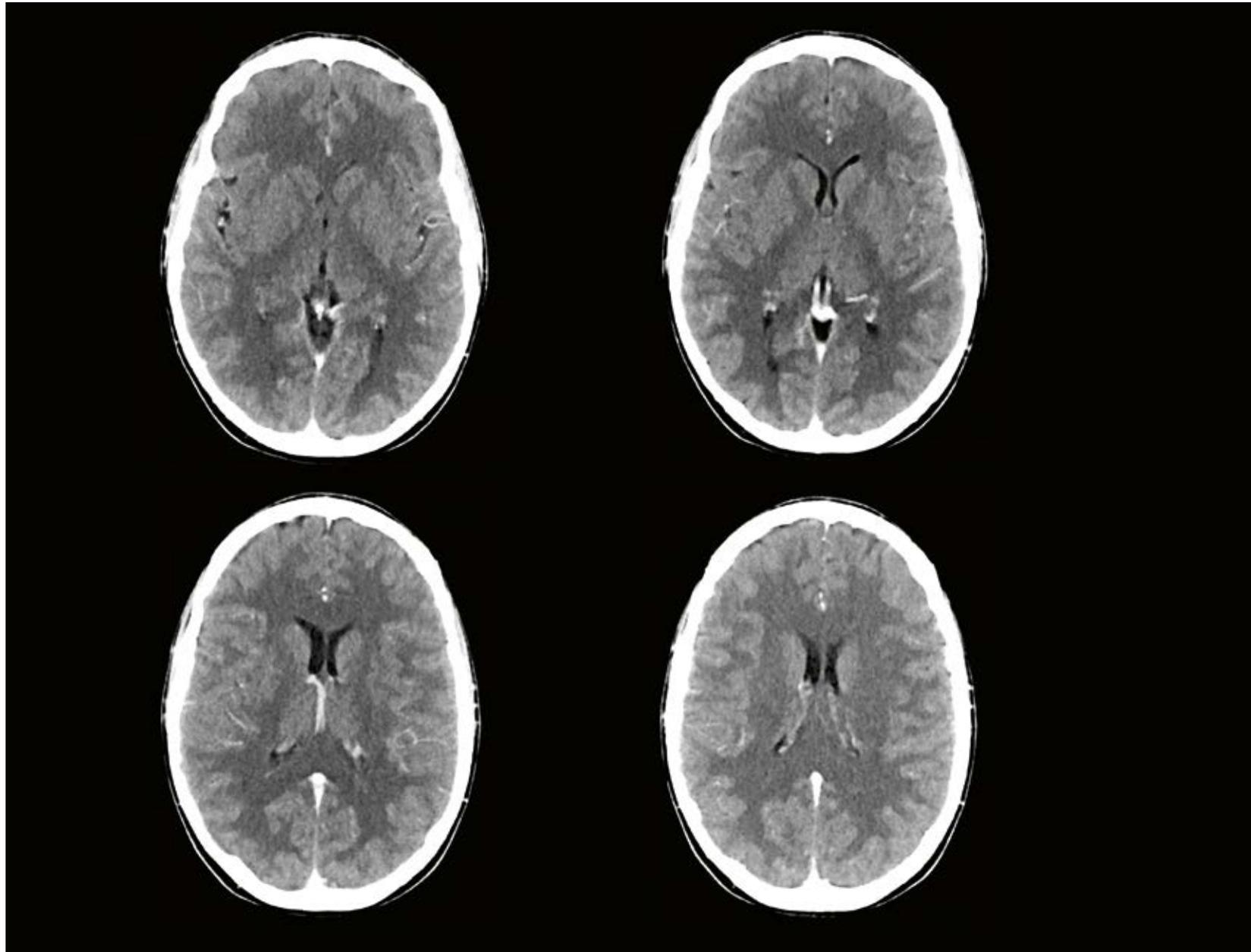
**Rotation time:**  
1.0 s

**Tube settings:**  
100 kV, 422 eff. mAs

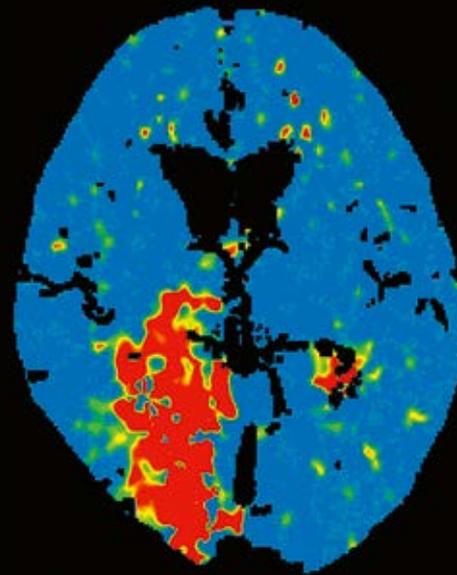
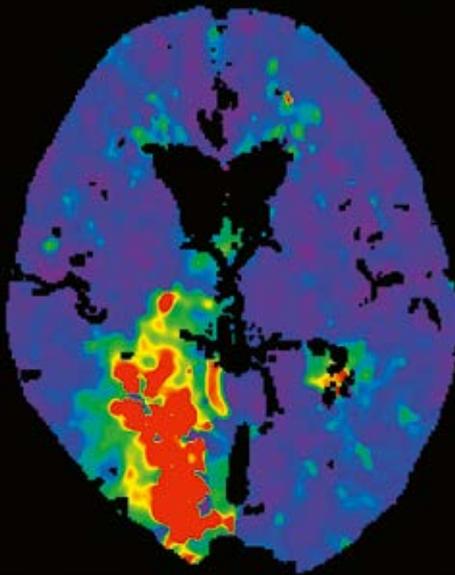
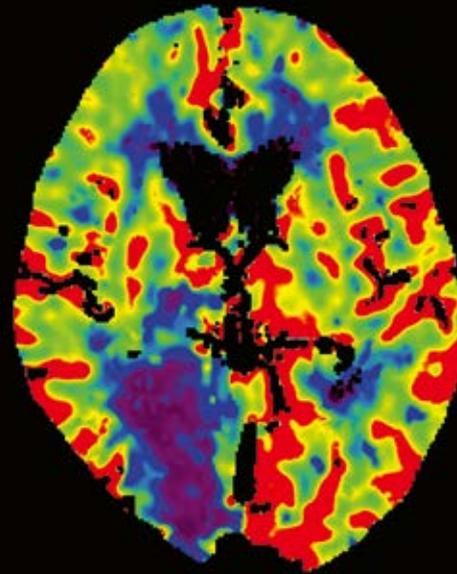
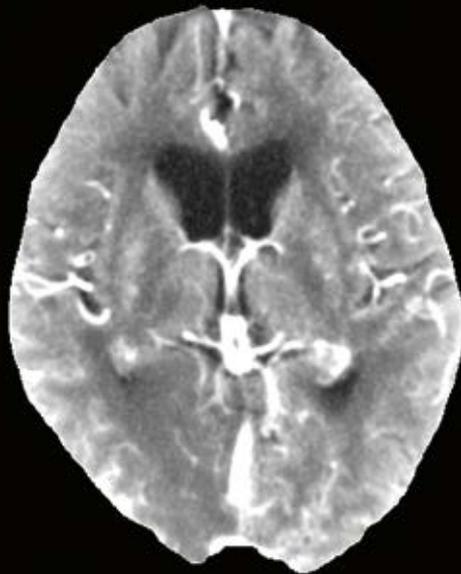
**CTDI<sub>vol</sub>:**  
40.92 mGy

**DLP:**  
706 mGy cm

**Eff. dose:**  
1.48 mSv



.....  
**Cerebrum –**  
ADMIRE, the latest  
generation of iterative  
reconstruction, greatly  
enhances image quality  
while reducing radiation  
dose. In this cerebral  
examination, great gray-  
white matter differentiation  
was achieved using a  
reduced radiation dose in  
combination with ADMIRE.  
.....



**Collimation:**  
32 x 1.2 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
44.0 s

**Scan length:**  
90 mm

**Rotation time:**  
0.5 s

**Tube settings:**  
80 kV, 200 eff. mAs

**CTDI<sub>vol</sub>:**  
237.49 mGy

**DLP:**  
2,800 mGy cm

**Eff. dose:**  
5.88 mSv

.....  
**Comprehensive stroke assessment –**

The Adaptive 4D Spiral brings perfusion scanning to a new level. Being able to evaluate perfusion deficits in a very short time, and effortlessly acquire a scan range beyond the detector coverage, greatly improves stroke assessment and workflow.

.....

**Collimation:**  
16 x 0.3 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
12 s

**Scan length:**  
49 mm

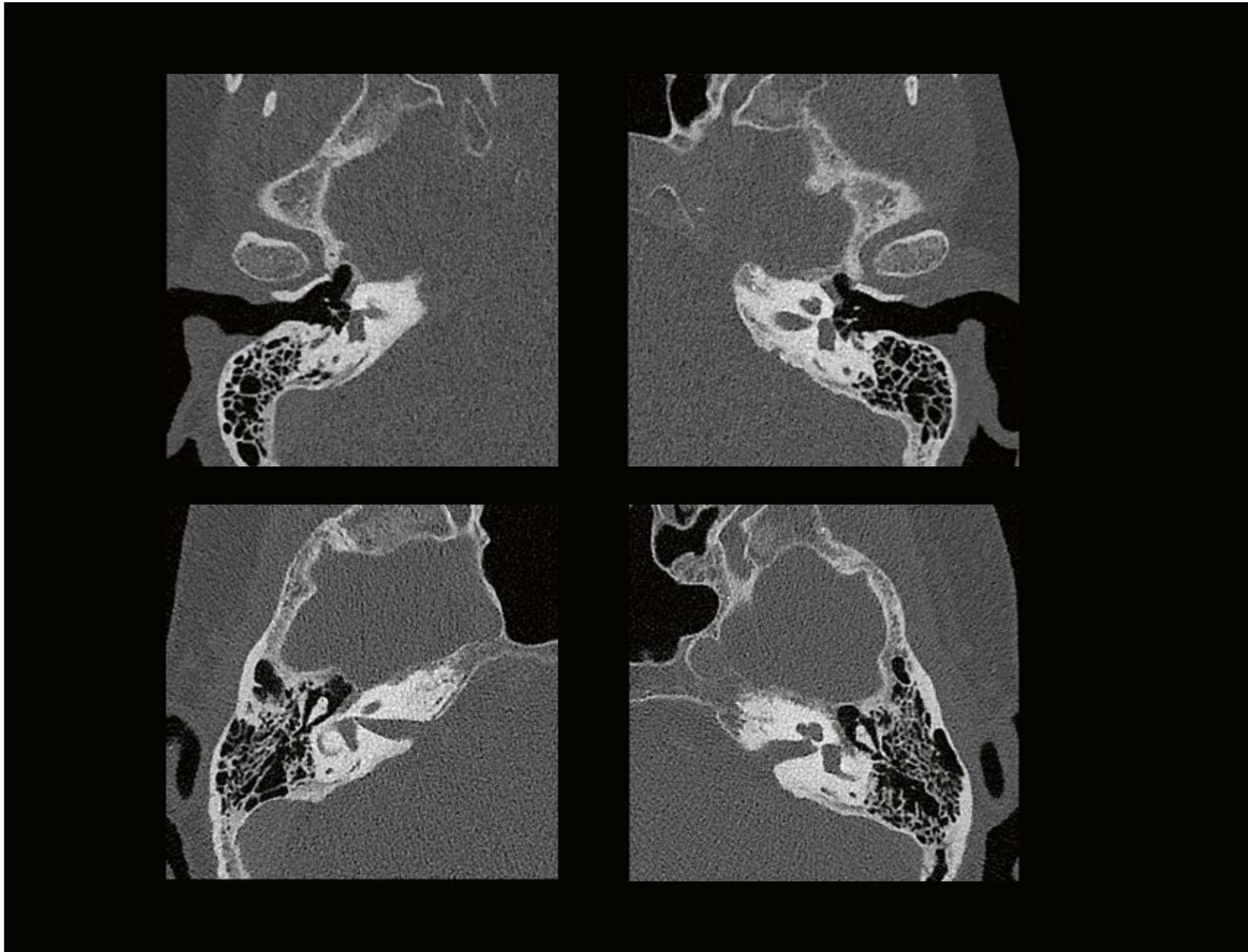
**Rotation time:**  
1.0 s

**Tube settings:**  
120 kV, 121 mAs

**CTDI<sub>vol</sub>:**  
27.08 mGy

**DLP:**  
148 mGy cm

**Eff. dose:**  
0.46 mSv



.....  
**Inner ear imaging –**  
Higher spatial resolution  
enables z-UHR-like image  
quality in less time and  
with less dose.  
.....

**Collimation:**

16 x 0.3 mm

**Spatial resolution:**

0.30 mm

**Scan time:**

52.0 s

**Scan length:**

209 mm

**Rotation time:**

1.0 s

**Tube settings:**

120 kV, 232 eff. mAs

**CTDI<sub>vol</sub>:**

21.89 mGy

**DLP:**

454 mGy cm

**Eff. dose:**

0.36 mSv

.....  
**Lateral ankle joint fracture –**

In trauma cases, higher spatial resolution shows even very fine structures like on this fibula bone splintering.

.....



**Collimation:**  
64 x 0.6 mm

**Scan time:**  
44 s

**Scan length:**  
1,534 mm

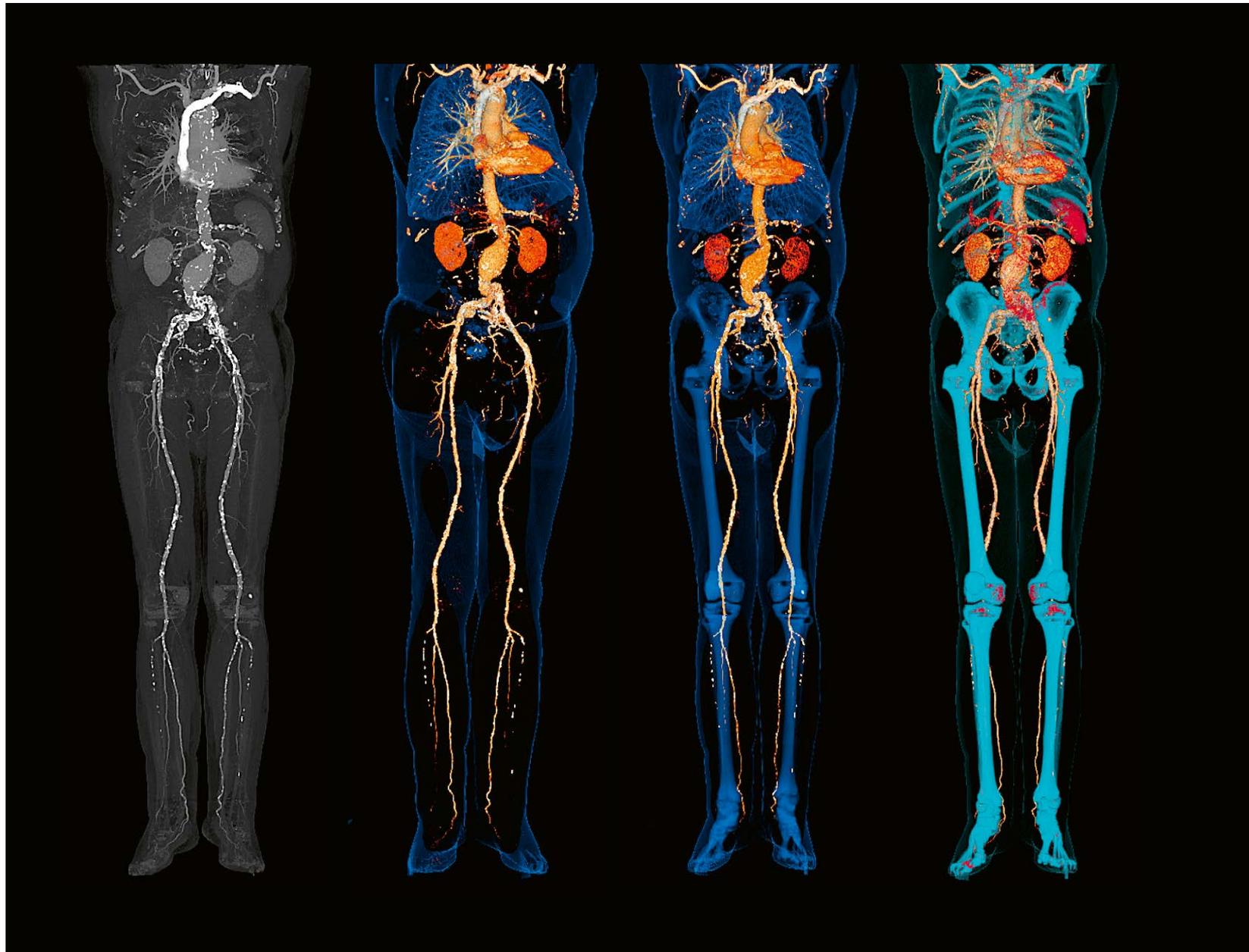
**Rotation time:**  
0.33 s

**Tube settings:**  
AuSn 120 kV, 301 eff. mAs

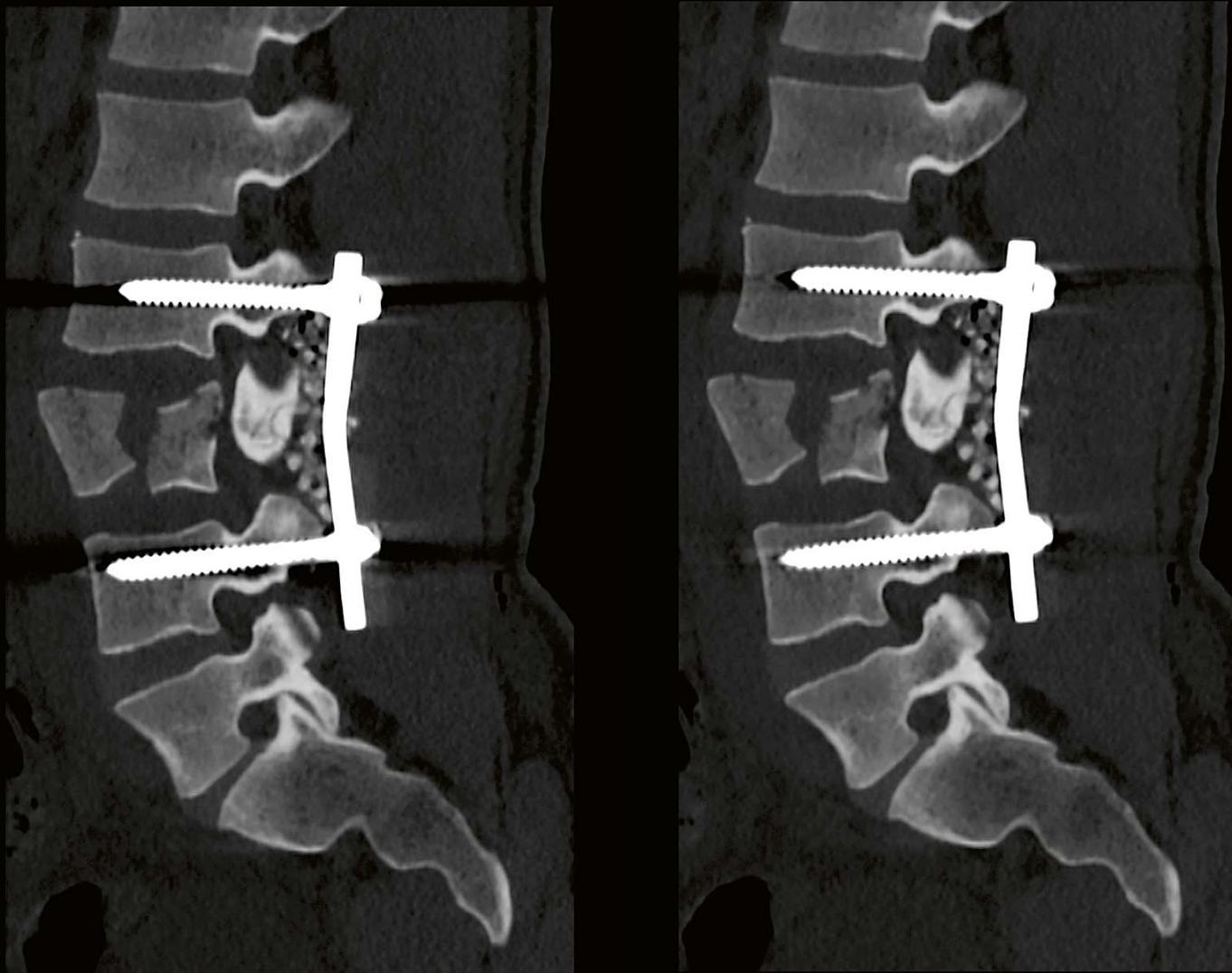
**CTDI<sub>vol</sub>:**  
6.44 mGy

**DLP:**  
1,007.8 mGy cm  
140 ml Imeron 350

**Eff. dose:**  
8 mSv



.....  
**Infra-renal abdominal aortic aneurysm (AAA) – TwinBeam Dual Energy** acquires a whole body CTA at two different energy levels in a single scan. Such a large dataset can be converted into three dimensional visualizations very conveniently and easily using automatic bone removal.  
.....



**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
7.0 s

**Scan length:**  
260 mm

**Rotation time:**  
1.0 s

**Tube settings:**  
120 kV, 206 mAs

**CTDI<sub>vol</sub>:**  
13.90 mGy

**DLP:**  
392.2 mGy cm

**Eff. dose:**  
5.9 mSv

.....  
**Follow-up on spinal fixation –**  
iMAR applies iterative corrections to reduce metal artifacts effectively. It can be routinely applied in follow-up imaging, such as spinal fixation, to visualize the location of the screws and the structures of the spine.  
.....

**Collimation:**  
128 x 0.6 mm

**Scan time:**  
9.5 s

**Scan length:**  
449 mm

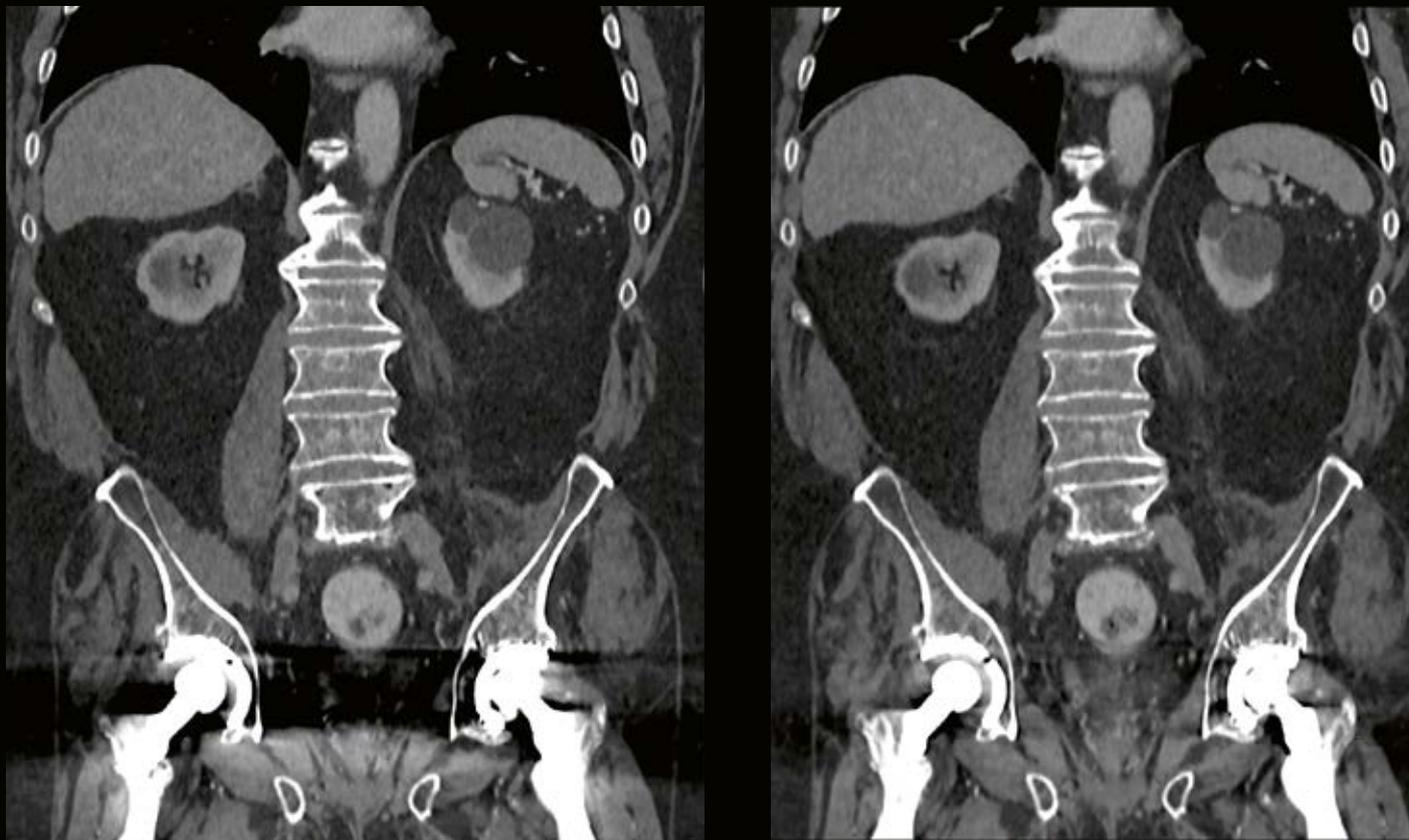
**Rotation time:**  
0.5 s

**Tube settings:**  
100 kV, 372 eff. mAs

**CTDI<sub>vol</sub>:**  
14.7 mGy

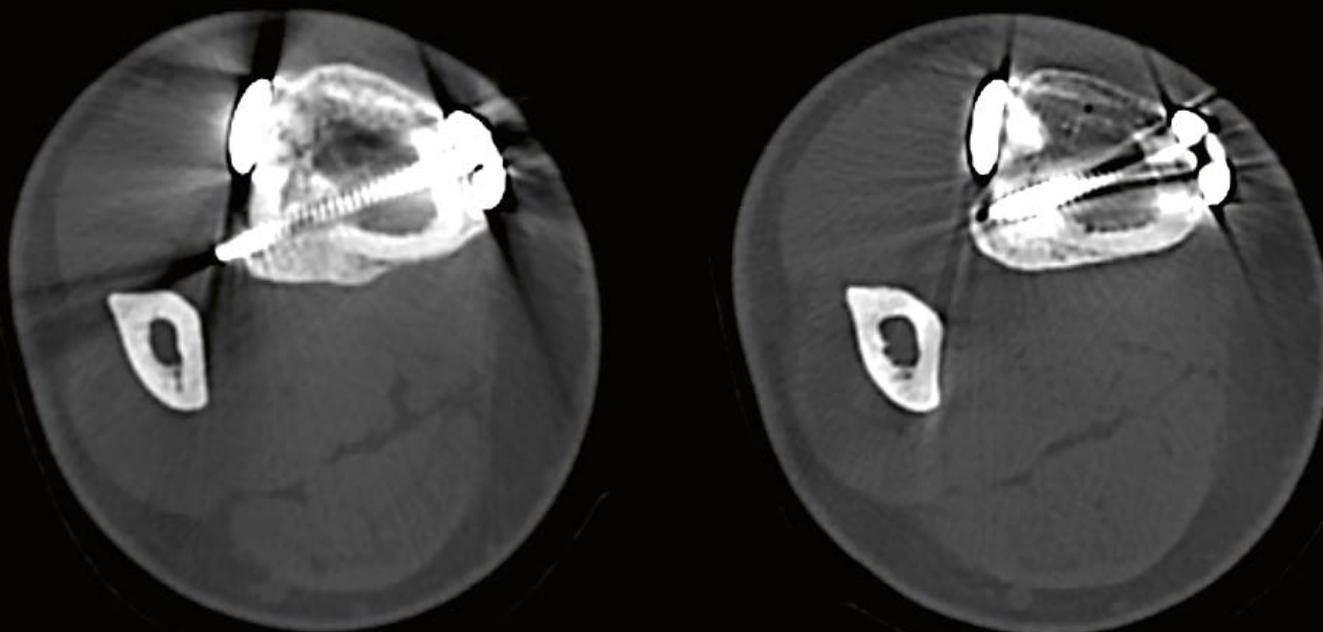
**DLP:**  
682.4 mGy cm

**Eff. dose:**  
10.2 mSv



.....  
**Pelvic imaging with bilateral hip prostheses – iMAR technology can also be applied in challenging cases, such as pelvic imaging with bilateral hip prostheses, to enhance diagnostic confidence.**  
.....

*Courtesy of Lucerne Kantonsspital, Lucerne, Switzerland*



**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
4.4 s

**Scan length:**  
147 mm

**Rotation time:**  
0.5 s

**Tube settings:**  
120 kV, 157 mAs

**CTDI<sub>vol</sub>:**  
10.61 mGy

**DLP:**  
173.3 mGy cm

**Eff. dose:**  
2.6 mSv

.....

**Pre-biopsy imaging of a small tumor adjacent to a tibial metal implant –**  
iMAR technology can even be applied in very difficult cases, such as a small tumor adjacent to a tibial metal fixation, to provide clear guidance for biopsy.

.....

**Collimation:**  
128 x 0.6 mm

**Spatial resolution:**  
0.30 mm

**Scan time:**  
1.86 s

**Scan length:**  
300 mm

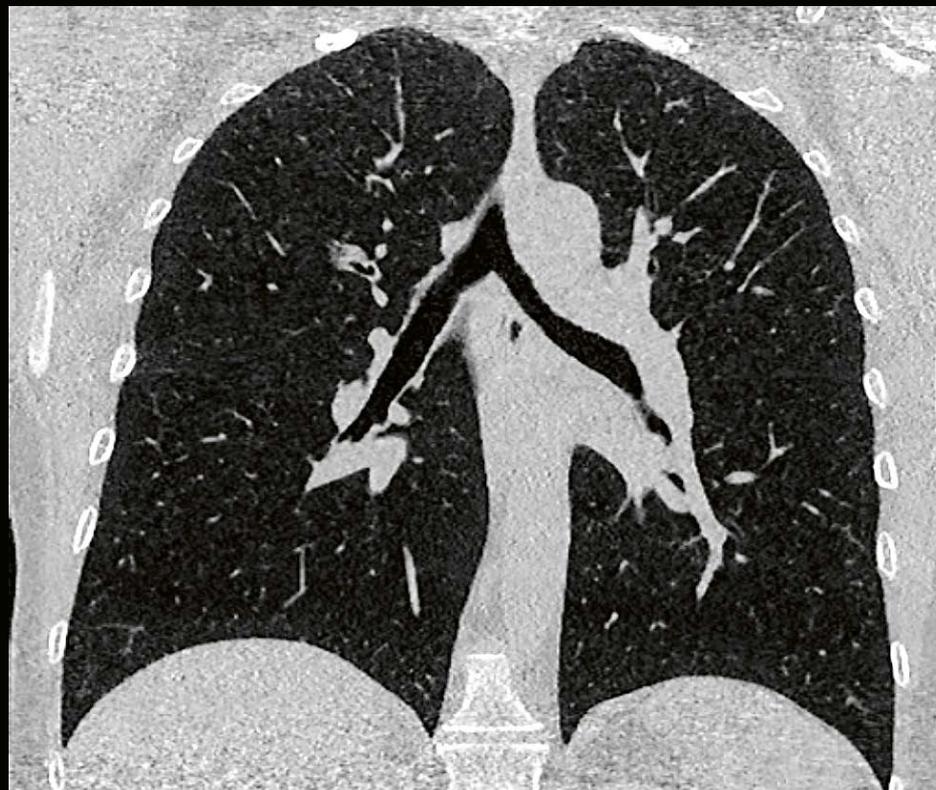
**Rotation time:**  
0.28 s

**Tube settings:**  
100 kV, 10 eff. mAs

**CTDI<sub>vol</sub>:**  
0.39 mGy

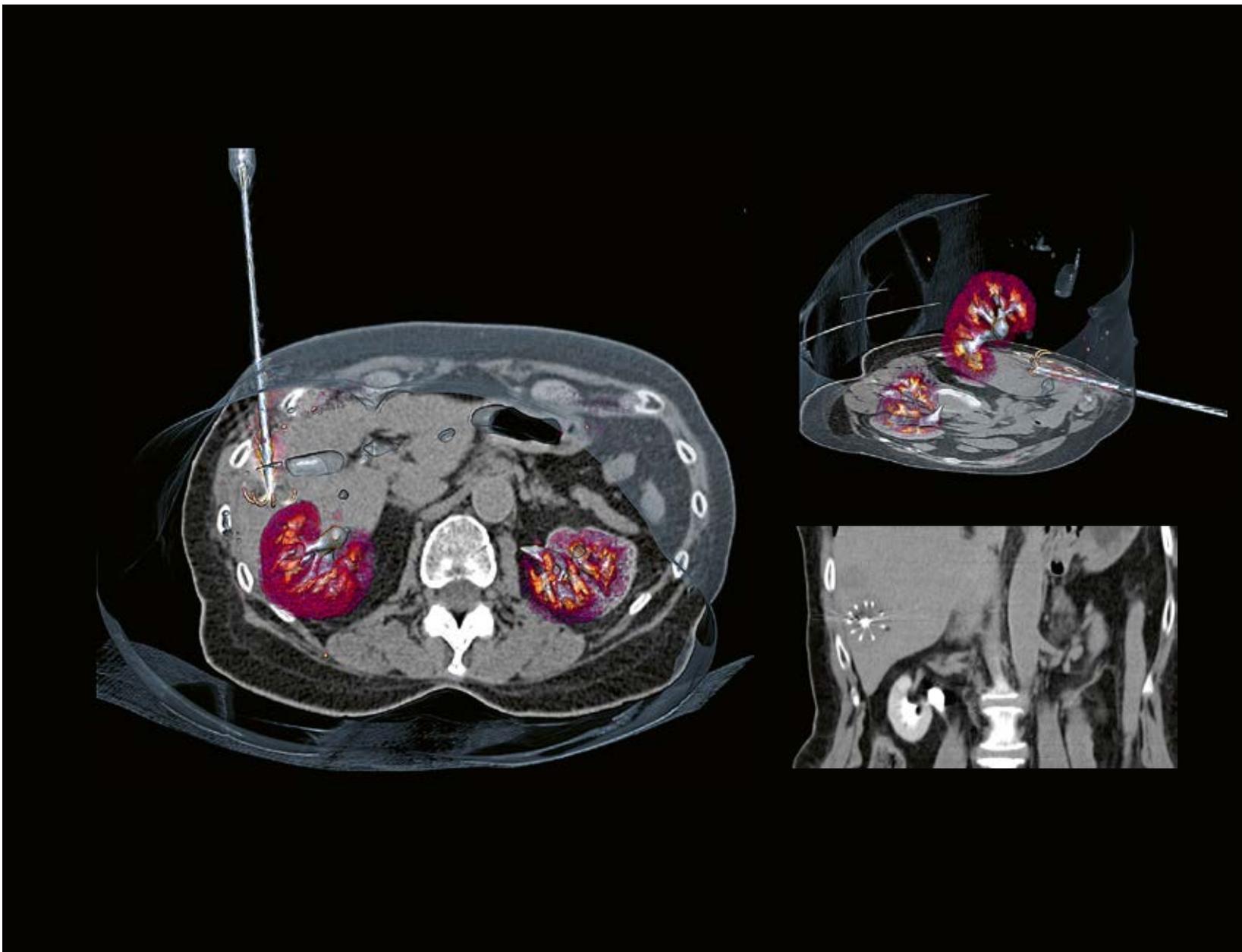
**DLP:**  
15 mGy cm

**Eff. dose:**  
0.21 mSv



**Rule-out of pulmonary diseases –**

The Stellar detector, in combination with high-end iterative reconstruction algorithms, such as SAFIRE and ADMIRE, facilitates the ruling out of pulmonary disease at an early stage using ultra low doses.



**Collimation:**  
128 x 0.6 mm

**Scan time:**  
3.0 s

**Scan length:**  
179 mm

**Rotation time:**  
0.5 s

**Tube settings:**  
80 kV, 150 eff. mAs

.....

**Intervention of hepatic metastasis –**  
Adaptive 3D Intervention Suite enables high-end interventional procedures with near to real-time coronal, axial, and oblique image guidance. In this case, a tumor ablation.

.....

**Collimation:**  
64 x 0.6 mm

**Scan length:**  
650 mm

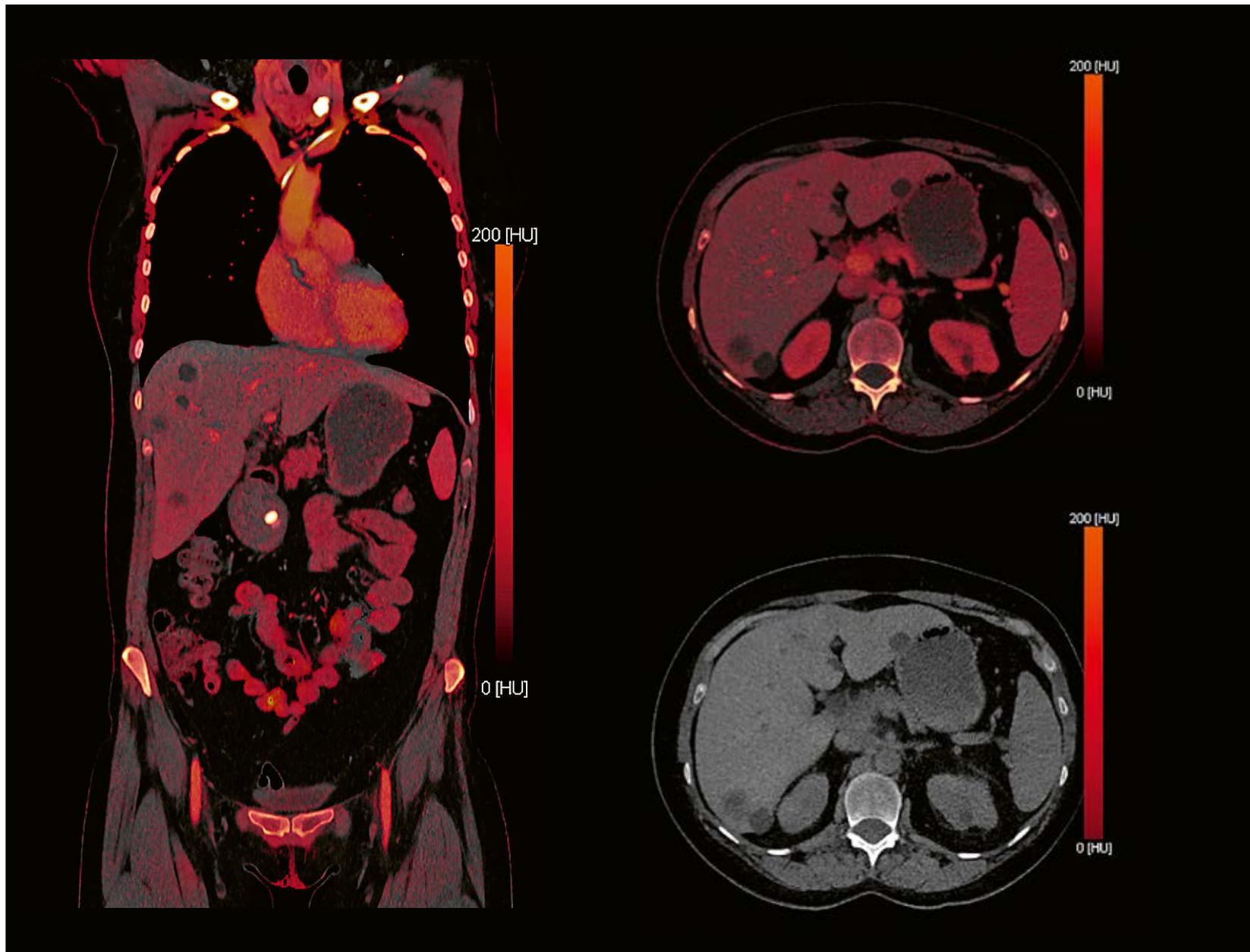
**Rotation time:**  
0.33 s

**Tube settings:**  
AuSn 120 kV, 355 mAs

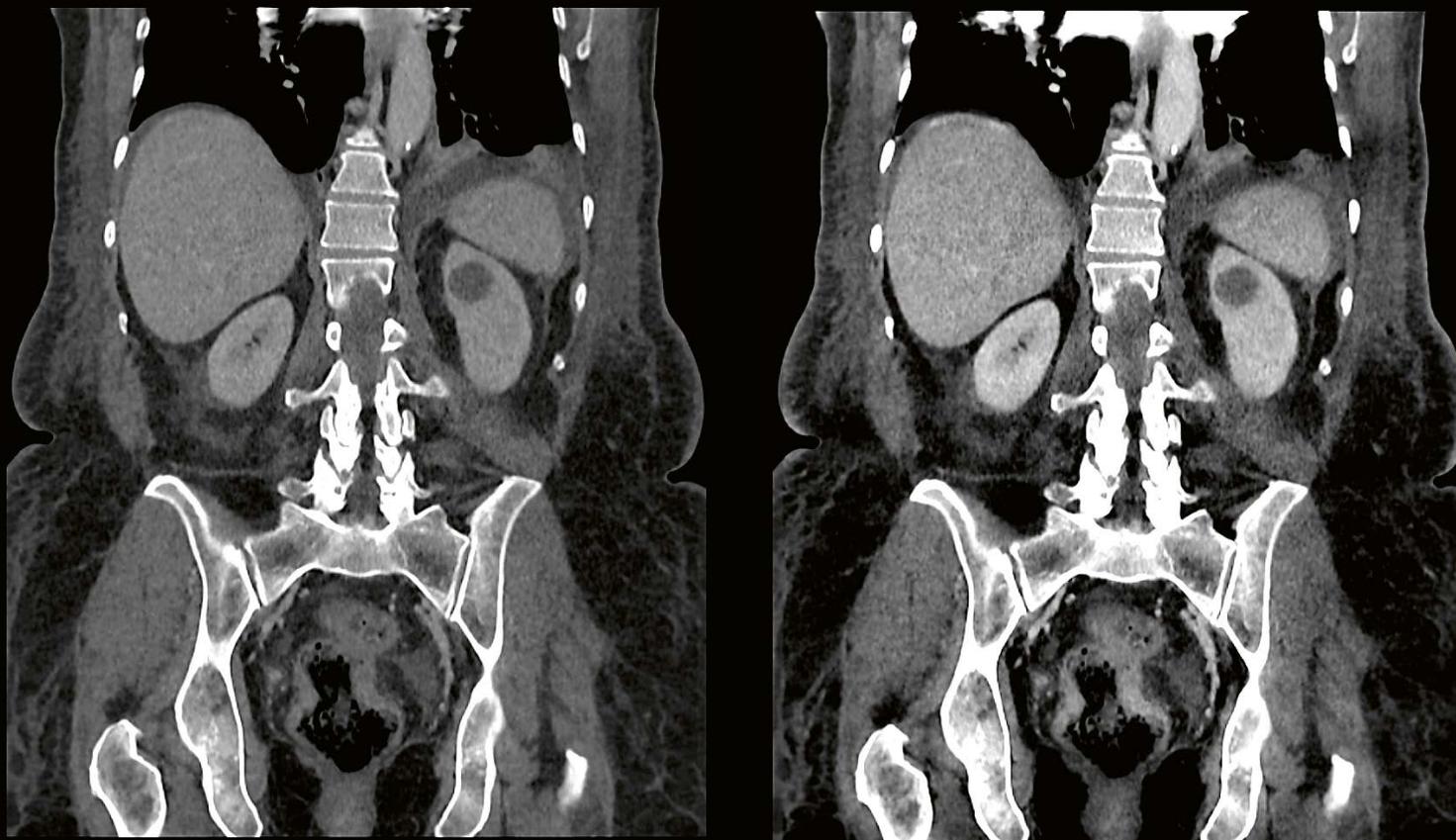
**CTDI<sub>vol</sub>:**  
7.6 mGy

**DLP:**  
508 mGy cm

**Eff. dose:**  
7.6 mSv



**Differential diagnosis of multiple hepatic lesions –**  
TwinBeam Dual Energy acquires body imaging at two different energy levels in a single scan. The characters of the multiple hepatic lesions can be clearly differentiated using Liver VNC.



**Collimation:**  
64 x 0.6 mm

**Scan time:**  
13.2 s

**Scan length:**  
468 mm

**Rotation time:**  
0.33 s

**Tube settings:**  
AuSn 120 kV, 467 eff. mAs

**CTDI<sub>vol</sub>:**  
10.00 mGy

**DLP:**  
486.3 mGy cm

**Eff. dose:**  
7.3 mSv

.....  
**Kidney cyst –**  
TwinBeam Dual Energy with  
monoenergetic imaging  
enhances the image contrast  
at lower keV settings,  
thus providing confidence  
in differential diagnosis.  
.....



## Exceeding expectations with the Stellar detector

SOMATOM Definition Edge with the Stellar detector introduces lower signal, lower voltage, and lower dose scanning – without compromising image quality and diagnostic reliability.

### **Innovation, integration, and a “stellar” performance**

The Stellar detector introduces the next generation of detector technology, succeeding gas and solid-state technology with conventional detector electronics. As a pioneer of high-end nanotechnology, Siemens Healthineers was the first to miniaturize the electronic components on the detector elements. For the first time, a healthcare provider was able to fully integrate the detector directly into the photodiode. This industry-first, full electronic integration will exceed expectations with a “stellar” performance.

The Stellar detector places SOMATOM Definition Edge in a class of its own with a routine spatial resolution of up to 0.30 mm, allowing visualizations of very fine structures or lesions.



The STRATON tube and the newly designed gantry enable high spatial resolution even at an acquisition speed of up to 23 cm/s. This takes motion out of the equation.

## Less “problematic”, more “perfect”

With conventional detector technology, CT specialists are used to electronic noise and cross-talk, which often compromises image quality and diagnostic value. Based on the full electronic integration of the Stellar detector, Siemens Healthineers’ exclusive TrueSignal technology significantly reduces noise and cross-talk. Intrinsic slice blurring between neighboring detector rows is avoided, and individual slice profiles are generated with much greater precision. In combination with Edge technology, an almost-perfect model of the focal spot and detector is capable of generating a slice thickness of 0.5 mm, sufficient in everyday clinical routine for virtually all cases.

## High spatial resolution, excellent signal-to-noise ratio

Conventional CT compensates for slice blurring, noise, and cross-talk by increasing the dose. The TrueSignal technology of the Stellar detector exceeds expectations by offering a solution to this challenge: Instead of increasing the dose, it makes more efficient use of the initially available quanta per voxel. High spatial resolution and a high signal-to-noise ratio (SNR) are reliable indicators of excellent image quality. In addition, the Stellar detector provides a homogeneous slice profile over the field of view (FoV), which is essential for consistently high image quality.

## More efficiency, more range, more patients

At high signal levels, image noise is more or less the same across different CT technologies. However, when the signal is lowered – either by high attenuation from obese or broad-shouldered patients, or by reducing the applied mA – the impact of TrueSignal technology increases, as the detector can make better use of the measured signal. Fully integrated, the Stellar detector will also benefit your patient outcomes with an extended dynamic range (HiDynamics) as there is no need to switch bandwidth. This means that the detector’s sensitivity for visualizing finer structures, especially for low-kV datasets, is substantially increased.

# Exceeding expectations with TwinBeam Dual Energy

The SOMATOM Definition Edge offers great versatility with dose-efficient, comprehensive Dual Energy capabilities for virtually all patients.

## Innovative Single Source Dual Energy solution

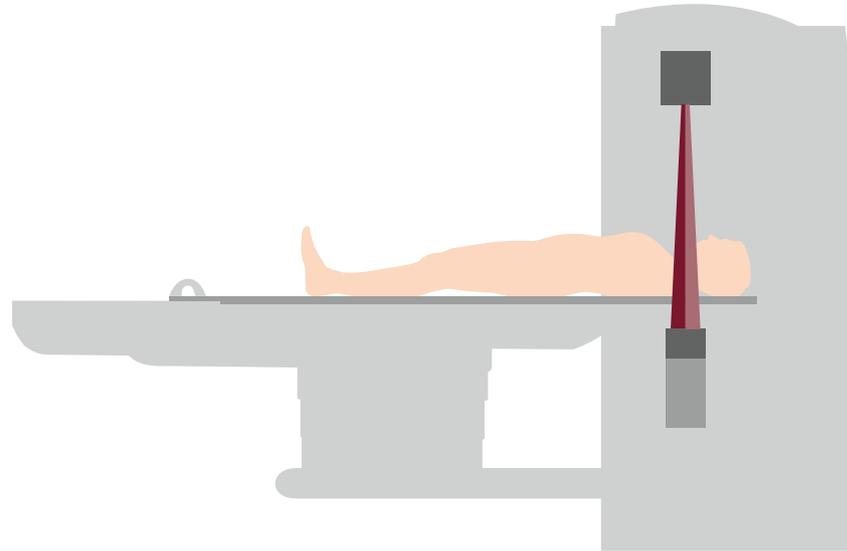
To bring the benefits of Dual Energy to more patients, Siemens Healthineers introduced Single Source Dual Energy with the Dual Spiral approach. The SOMATOM Definition Edge now expands the Dual Energy portfolio even further, introducing the TwinBeam Dual Energy™ technology. This innovative Dual Energy approach allows for the simultaneous acquisition of high and low-kV datasets in a single CT scan, enabling high-contrast dynamic applications.

## How it works

Siemens Healthineers TwinBeam Dual Energy is routinely applicable for virtually all patients without compromising the image quality or radiation dose. To create two X-ray spectra simultaneously from one tube, the Straton® MX P X-ray tube assembly system generates a prefiltered X-ray beam, creating two different X-ray spectra – a high- and a low-energy spectrum – before it reaches the patient. Due to the additional filtration, this acquisition technique requires sufficient tube power reserves, which are readily available on Siemens Healthineers CT scanners with the Straton® MX P X-ray tube.

## Expanding your clinical routine

A large variety of syngo.via Dual Energy applications are now available for cases acquired with Single Source Dual Energy. Image acquisition is possible for all rotation times (up to 0.28 seconds), for the full field of view of 50 cm, and with the full number of projections for both spectra. In terms of detection, the simultaneously acquired low- and high-energy data can be reconstructed separately and examined independently. Alternatively, a composite reconstruction is available (disregarding spectral differences) to give a single-energy image dataset with excellent diagnostic image quality.



With TwinBeam Dual Energy, the X-ray beam is split up into a high- and low-energy spectrum enabling high-contrast dynamic applications.

## Routine ready workflow

TwinBeam Dual Energy in combination with FAST DE Results paves the way for Dual Energy in clinical routine. As part of an advanced workflow, FAST DE Results generates Dual Energy datasets at the acquisition workplace, and the results are sent directly to the reading environment for a straightforward Dual Energy workflow with advanced diagnostic information. This is enabled through the reconstruction of monoenergetic images at different keV levels, as mixed, optimum contrast and virtual non-contrast (VNC) images without additional interaction.

## Zero Click post-processing with Rapid Results<sup>6</sup>

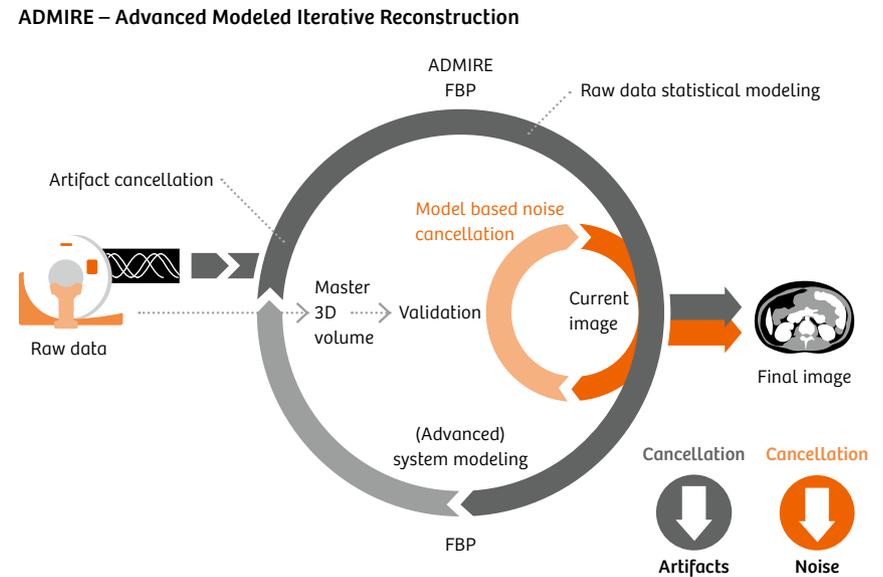
The Rapid Results technology makes post-processing Dual Energy images part of the standard reconstruction task. Rapid Results produces standardized and consistent image quality independent of the operator and delivers ready-to-read Dual Energy results directly to the PACS. This makes Dual Energy exams available for daily routine exams.

## Major clinical benefits

Additional major clinical benefits include, for example, evaluations of pulmonary embolisms using *syngo*.CT DE Lung Analysis. This application provides immediate diagnostic information such as the location of the affected vessel and details of the perfusion defect in the parenchyma. TwinBeam Dual Energy together with *syngo*.CT DE Direct Angio is designed to perform high dynamic/arterial phase Dual Energy scans, offering you a bone-free view of the vascular system.

# Exceeding expectations with the Right Dose

SOMATOM Definition Edge helps you achieve the ideal balance between radiation dose and image quality – providing sound and sustainable results while guaranteeing maximum patient safety.



## Above all, ALARA

Medical imaging is based on two essential pillars: Sound and sustainable clinical results, and the best possible patient safety. When it comes to applying radiation, ALARA – As Low As Reasonably Achievable – is the overarching principle. Innovation leader Siemens Healthineers has been at the forefront of radiation reduction for decades – scans at sub-mSv doses have found their way into clinical routine. However, no single dose level fits everyone. Every clinical question and every single patient requires individual, meticulous dose management. Siemens Healthineers has pioneered this principle and continues to drive innovation with its CARE Right and Right Dose programs and philosophy.

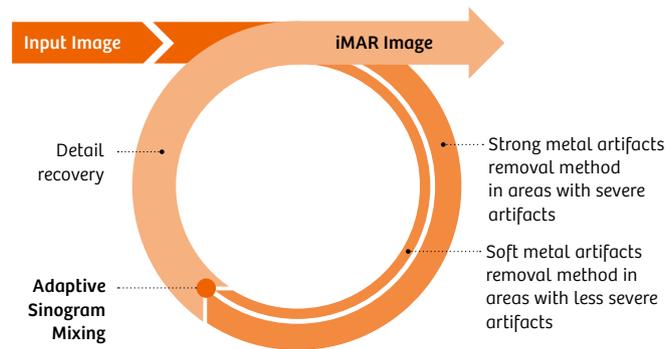
## Perfect CARE for all patients

Siemens Healthineers' comprehensive CARE – Combined Applications to Reduce Exposure – portfolio offers innovative and unique dose reduction features. CARE kV, for example, is the industry's first tool that automatically determines the appropriate kV and scan parameter settings to help deliver the right dose for a particular scan, and with user-defined image quality. In combination with the Straton® MX P X-ray tube and Siemens Healthineers' Sinogram Affirmed Iterative Reconstruction (SAFIRE)<sup>3</sup>, CARE offers low-kV imaging down to 70 kV, enhanced contrast media for advanced diagnostic information, and enables dose savings of up to 60%<sup>3</sup>.

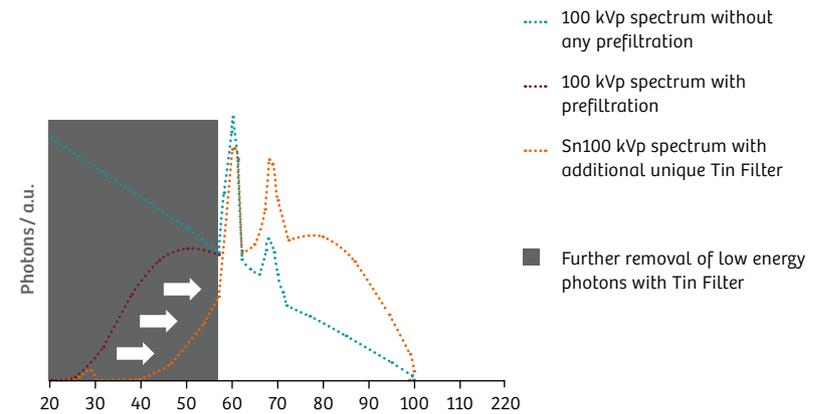
## Enhancing everything: ADMIRE

With ADMIRE<sup>4</sup> – Siemens Healthineers' Advanced Modeled Iterative Reconstruction – you can smoothly integrate exceptionally low doses and excellent image quality into your daily routine. ADMIRE clinical images provide higher resolution at organ borders and improved delineation of edges, e.g. to better localize lesions. Thick slices are now reconstructed at a more natural image impression, even from ultra-low-dose scans. Iteratively reconstructed low-dose datasets can now easily be stored in PACS or on film – ADMIRE gives clinicians access to enhanced image quality with a natural image impression, and all clinical applications, while utilizing the full dose reduction potential offered by iterative reconstruction.

**iMAR – iterative Metal Artifacts Reduction**



**Tin Filter**



**Easy to adapt:  
Adaptive Dose Shield**

The Adaptive Dose Shield eliminates over-radiation pre- and post-spiral to the patient. By dynamically moving shields into place on the X-ray tube, it blocks clinically irrelevant doses – not only for dedicated applications, but for every single spiral acquisition. The Adaptive Dose Shield dynamically opens at the beginning of a spiral range and then dynamically closes at the end, effortlessly avoiding exposure of tissue that will never be part of the reconstructed images, resulting in significant dose reductions without affecting image quality.

**iMAR –  
iterative Metal Artifacts Reduction**

iMAR improves diagnostic confidence by reducing metal artifacts – even in challenging cases like dental fillings, spine implants, and pacemakers. iMAR is based on Adaptive Sinogram Mixing. It combines a strong metal artifact removal method in areas with severe artifacts with a soft correction in areas with less-severe artifacts. The result is outstanding image quality without the metal artifacts and with the valuable information.

**Tin Filter  
technology**

Siemens Healthineers unique Tin Filter technology delivers excellent results at dose levels comparable to conventional X-ray – for example in non-contrast studies like lung screening as well as orthopedic and sinus scanning – by filtering out clinically irrelevant low-energy radiation.



## Services

A range of innovative service solutions provide the answers to best support our customers in raising quality and productivity in healthcare.

### **Maintainable healthcare**

Providing economically viable healthcare means efficiently and productively delivering the highest quality care possible. This is why Siemens Healthineers works closely with our customers, offering experience and innovative solutions to increase uptime, improve performance, and optimize workflow for maintainable healthcare. This means raised quality, better productivity, and greater cost-effectiveness.

### **Increased availability with System Performance Services**

Peak performances and higher uptime are achieved by proactively ensuring system availability with innovative service solutions. Smart Remote Services, for example, establish a highly efficient, secure and certified remote connection between CT systems and the Siemens Healthineers' service organization for remote monitoring and remote fixing in order to maximize availability and performance.



## Proactive maintenance

With the Guardian Program™ including TubeGuard, potential tube downtime can be predicted ahead of time. This allows healthcare institutions to schedule maintenance without impairing regular patient hours for higher system efficiency.

## Improved operation with Education Excellence Services

Personalized education and training are the key to more expertise, greater efficiency, and higher productivity of the system operators. In addition, dedicated consultancy services facilitate the further improvement of system usage. Optimize CARE CT, for example, is a comprehensive program to help customers reduce radiation in CT scanning. The program provides expert insights, methods, and tools that assist customers in developing a customized road map towards improving their CT dose.

## Optimized utilization

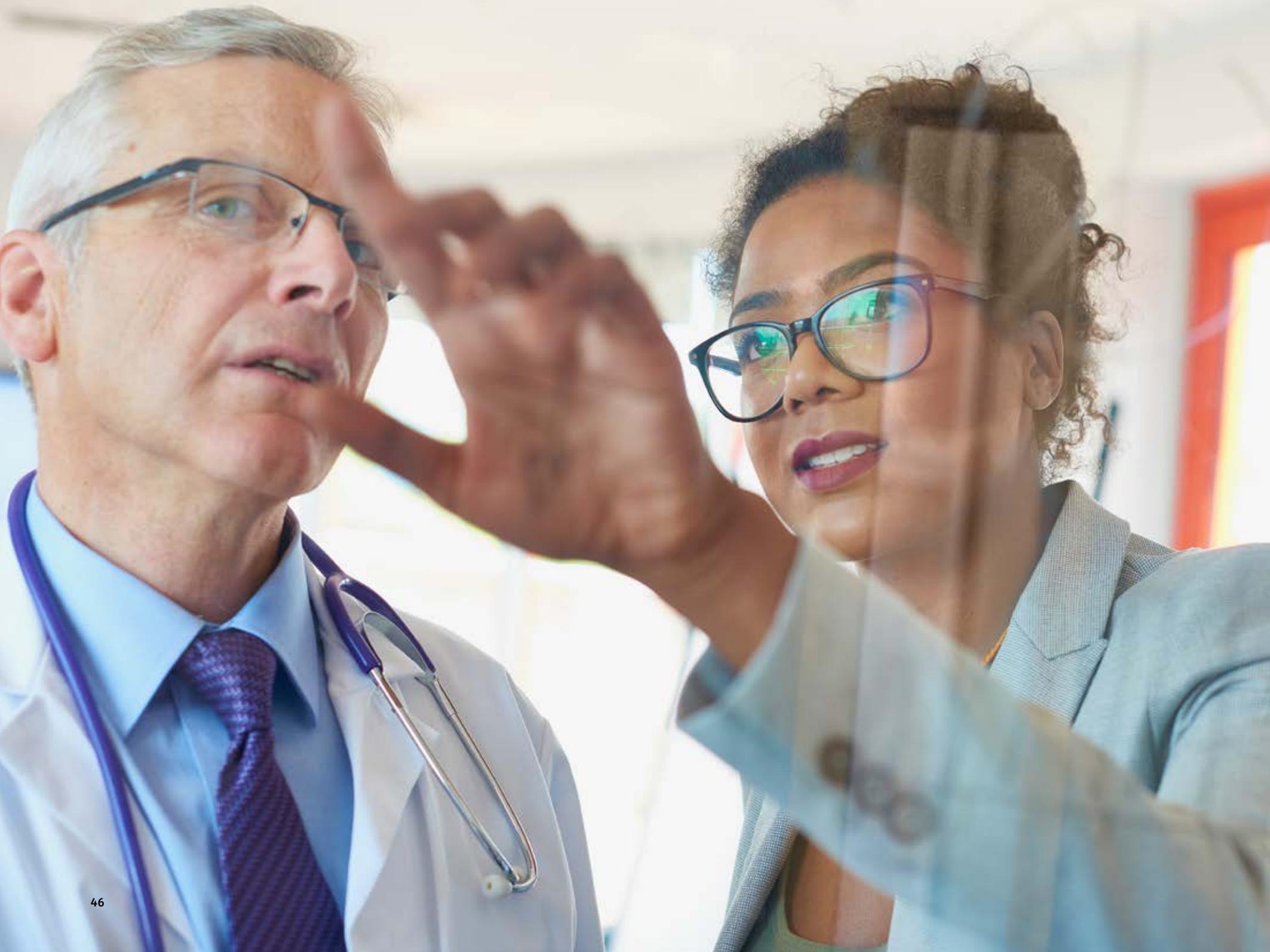
Increased workflow optimization and better productivity through process optimization and consulting help improve efficiency, system utilization, and return on investment. teamplay Usage is a comprehensive dashboard that provides performance transparency for scanners, workflow, examinations<sup>5</sup>, and personnel<sup>5</sup> across the entire department, or for individual modalities. Regular performance data assessment supports measures to increase efficiency.



# Technical specifications

## Key data

Detector .....	Stellar detector
Number of acquired slices .....	128
Number of reconstructed slices .....	384
Spatial resolution .....	0.30 mm
Rotation time .....	up to 0.28 s
Temporal resolution .....	up to 142 ms
Generator power .....	up to 100 kW
kV steps .....	70, 80, 100, 120, 140 kV
Max. scan speed .....	up to 23 cm/s
Table load .....	up to 307 kg/ 676 lbs
Gantry opening .....	78 cm



# Why Siemens Healthineers?

At Siemens Healthineers, our purpose is to enable healthcare providers to increase value by empowering them on their journey towards expanding precision medicine, transforming care delivery, and improving patient experience, all enabled by digitalizing healthcare.

An estimated 5 million patients globally everyday benefit from our innovative technologies and services in the areas of diagnostic and therapeutic imaging, laboratory diagnostics and molecular medicine, as well as digital health and enterprise services.

We are a leading medical technology company with over 170 years of experience and 18,000 patents globally. With more than 48,000 dedicated colleagues in 75 countries, we will continue to innovate and shape the future of healthcare.



**Follow us in various media**



[facebook.com/siemens-healthineers](https://facebook.com/siemens-healthineers)  
[linkedin.com/company/siemens-healthineers](https://linkedin.com/company/siemens-healthineers)  
[siemens.com/somatom-sessions](https://siemens.com/somatom-sessions)  
[healthcare.siemens.com/news](https://healthcare.siemens.com/news)

## Footnotes

- <sup>1</sup> *syngo.via can be used as a standalone device or together with a variety of syngo.via-based software options, which are medical devices in their own right.*
- <sup>2</sup> *Cinematic VRT is recommended for communication, education, and publication purposes and not intended for diagnostic reading.*
- <sup>3</sup> *In clinical practice, the use of SAFIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task. As determined from SOMATOM Definition Flash data, SAFIRE enables up to 60% dose reduction. Data on file.*
- <sup>4</sup> *Image quality as defined by low contrast detectability using a model observer method for evaluation. Equivalent low contrast detectability can be achieved with 80% to 85% less dose using ADMIRE at highest strength level for thin (0.6 mm) reconstruction slices in measured and simulated body and head phantoms for low contrast objects with different contrasts. See ADMIRE data sheet for further information. In clinical practice, the use of ADMIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.*
- <sup>5</sup> *Depending upon data privacy setting.*
- <sup>6</sup> *Prerequisite: syngo.via*



On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens Healthineers sales organization worldwide. Availability and packaging may vary by country and is subject to change without prior notice. Some/All of the features and products described herein may not be available in the United States.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which do not always have to be present in individual cases.

Siemens Healthineers reserves the right to modify the design, packaging, specifications, and options described herein without prior notice. Please contact your local Siemens Healthineers sales representative for the most current information.

Note: Any technical data contained in this document may vary within defined tolerances. Original images always lose a certain amount of detail when reproduced.

*syngo.via* can be used as a stand-alone device or together with a variety of *syngo.via*-based software options, which are medical devices in their own rights.

Usage of *syngo.via* for an emergency case requires customer to provide respective emergency measures in case of non-availability of system or network.

.....  
**Siemens Healthineers Headquarters**

Siemens Healthcare GmbH  
Henkestr. 127  
91052 Erlangen, Germany  
Phone: +49 9131 84-0  
siemens-healthineers.com