Get further.

With the CT

Acute Care Engine.

siemens.com/clinical-engines

SIEMENS Healthineers

Get further with your CT.

Get the most out of your images
Medical progress is never made simply by maintaining the status quo. Year after year, the CT Clinical Engines have enhanced your clinical capabilities by providing better diagnostic confidence and improving process efficiency through fewer work steps and making your entire patient pathway even faster.

See what's relevant
Trauma situations require a quick and comprehensive diagnosis. With the VB20 Version of the CT Acute Care Engine, you get a valuable instrument that provides several automated applications to facilitate diagnosis and treatment when your time is tight.

Deliver to the point
With the new improvements in Rapid Results, you can automate post-processing in many more clinical areas and get ready-to-read results in your PACS or wherever you want them, standardizing image quality independent of the operator. This technology is available with Neuro Perfusion for stroke cases as an easy Auto-Stroke workflow, and with ALPHA (automatic landmarking and parsing of human anatomy) technology and Bone Reading for quick and enhanced bone assessment in trauma cases.

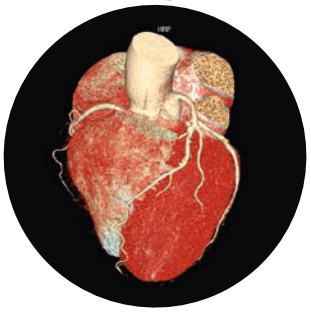
Enjoy the benefits of zero-click standard orientation for many different anatomies and automated rib and spine labeling and unfolding. Explore reading as simple as it should be.

CT Acute Care

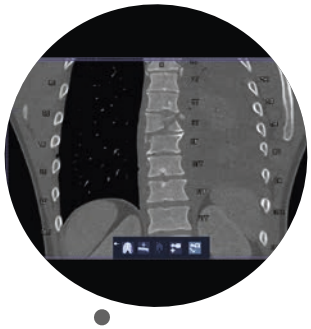
Applications and Engines

Overview

syngo.CT Vascular

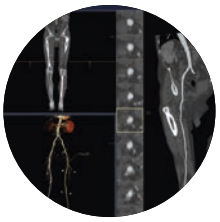


syngo.CT Cardiac

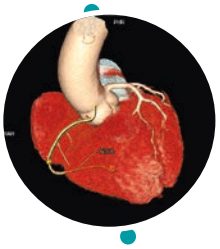


syngo.MM Reading

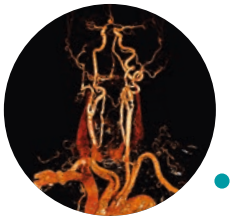
Standard Applications



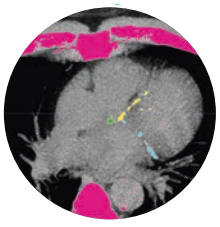
syngo.CT Vascular Analysis



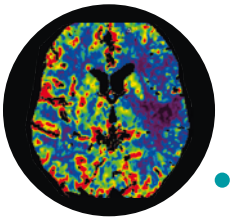
syngo.CT Coronary Analysis



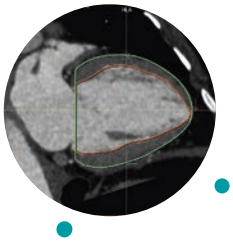
syngo.CT Neuro DSA



syngo.CT CaScoring

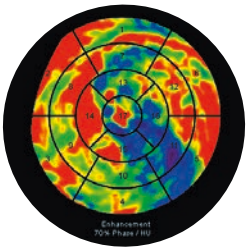


syngo.CT Neuro Perfusion



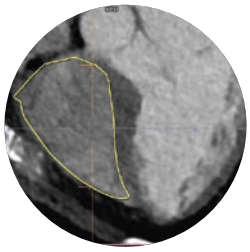
syngo.CT Cardiac Function

Engine

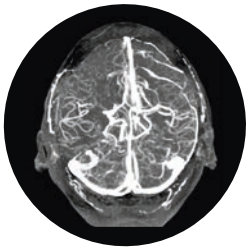


syngo.CT
Cardiac Function
– Enhancement

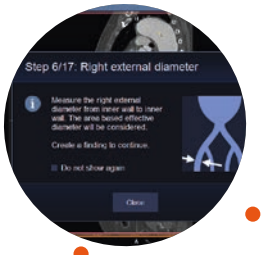
syngo.CT
Vascular Analysis
– Autotracer



syngo.CT
Cardiac Function
– Right Ventricle

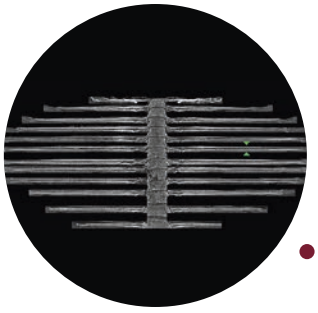


syngo.CT
Dynamic Angio



syngo.CT
Rapid Stent
Planning

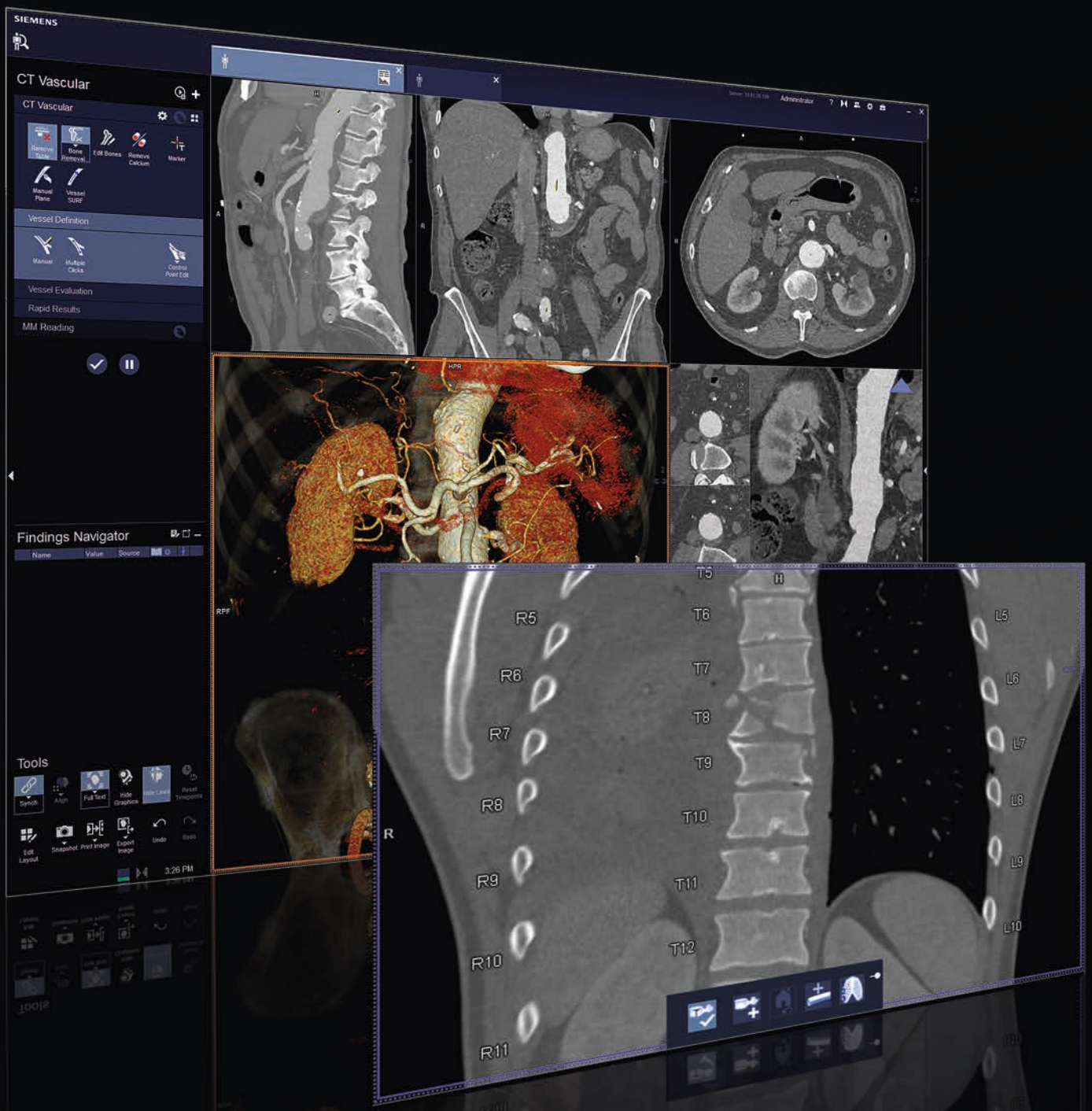
Engine Pro



syngo.CT
Bone Reading

syngo.via
Cinematic VRT

Options


SIEMENS
CT Vascular
CT Vascular
Vessel Definition
Vessel Evaluation
Rapid Results
MM Reading
Findings Navigator
Name
Value
Source
Tools
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Acute Care

Standard Applications

Based on many conversations with healthcare professionals, we have identified which functionalities are essential for an everyday clinical assessment. Acute Care Standard Applications bundle exactly those features that will additionally help you to speed up your routine acute care assessment.

syngo.CT Vascular

- Bone Removal
- Table Removal
- Review Marker
- Manual Vessel Tracking (> 2-click centerline)
- MPR
- Thin MIP Ranges
- Curved and Cross-Sectional MPR
- Integrated disease-specific reports

syngo.CT Cardiac

- Review Marker
- Plaque Visualization
- Heart Isolation
- Movie mode (Beating Heart)
- Manual Coronary Tracking (> 2-click centerline)
- Cardiac Planes
- Curved and Cross-Sectional MPR
- Integrated Reporting

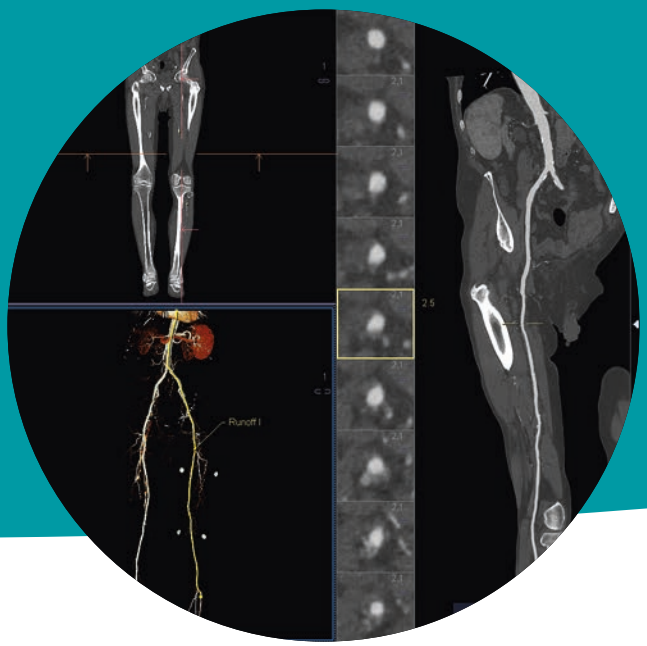
syngo.MM Reading

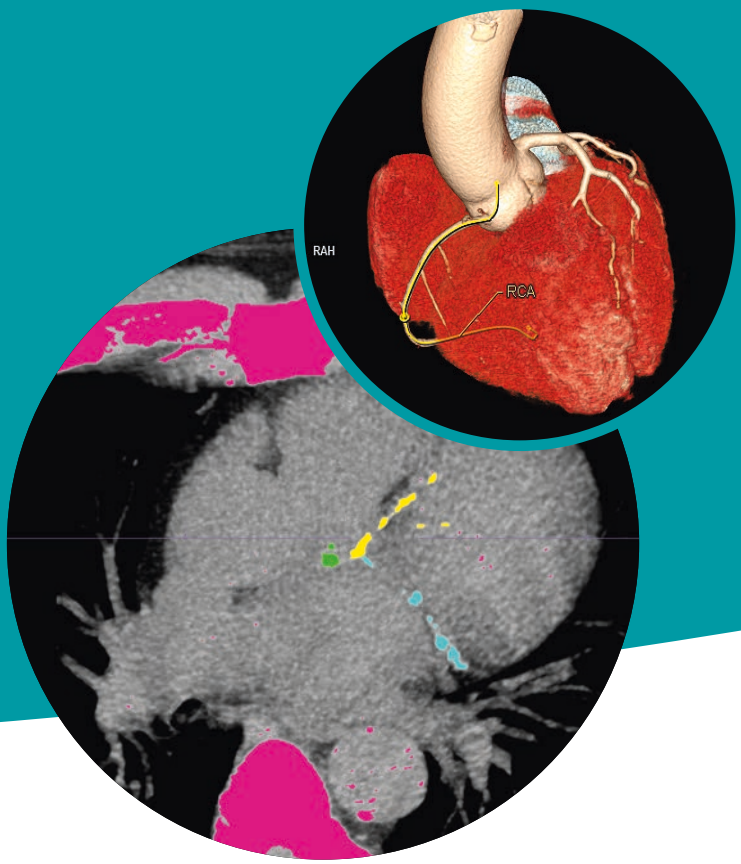
Anatomic intelligence

- Automatic spine and rib labeling
- Landmark registration
- Region-growing

Acute Care

Engine





Assessment and quantification of general vascular pathologies

syngo.CT Vascular Analysis

Accurate measurement is key to reliable abdominal aortic aneurysm (AAA) and thoracic aortic aneurysm (TAA) stent planning. Inexact placement of start and end points of a distance measurement compromises the optimal choice of the implant device. Calculating the effective vessel diameter can be cumbersome because vessel cross-sections are usually noncircular. In *syngo*.CT Vascular Analysis, reference markers are displayed in the VRT, enabling easy placement at the, e.g., ostia or the iliac bifurcation. The exact position can be fine-tuned through direct scrolling in cross-sections along the curved centerline. Also, the system automatically provides effective vessel diameters based on the cross-sectional area and perimeter.

Quick risk assessment and coronary age calculation

syngo.CT CaScoring

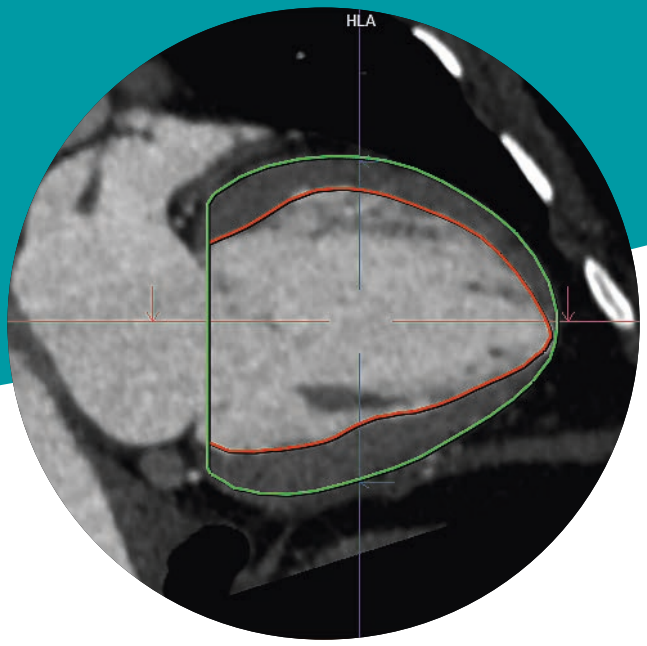
Assessment of coronary artery calcium burden can be used as a prognostic indicator of the patient's risk of morbidity/mortality from atherosclerotic coronary heart disease. The *syngo*.CT CaScoring package provides a one-stop comprehensive analysis of area (in mm^2), peak density (in Hounsfield units), volume (in mm^3), calcium mass (mg calcium hydroxyapatite), and score (Agatston method).

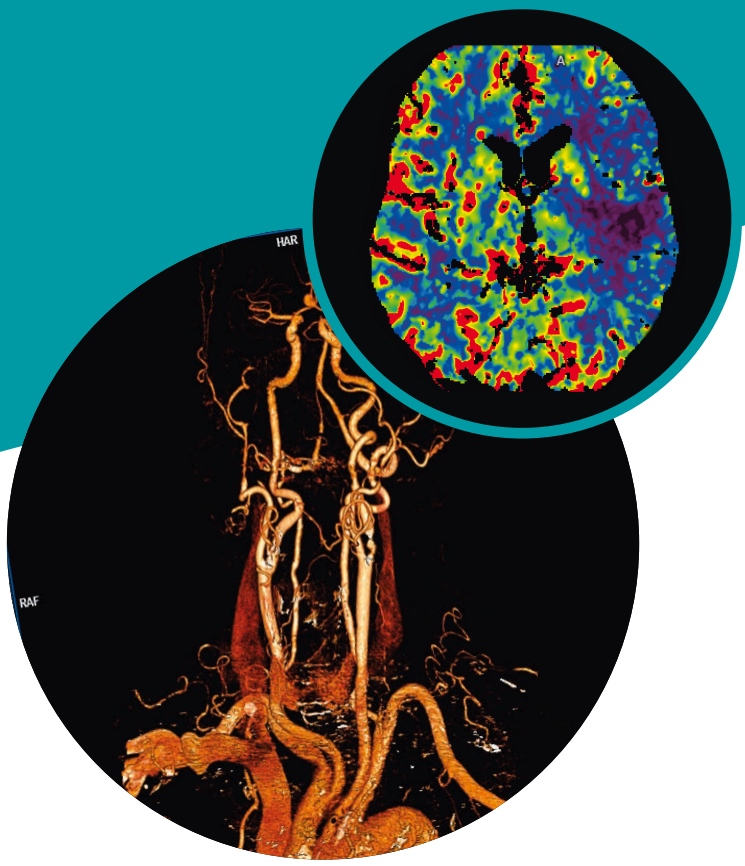
Rule out coronary artery disease in less than a minute[1]

syngo.CT Coronary Analysis

For a suspected acute coronary syndrome, it is essential to assess the entire coronary tree. Although severe stenoses may impair a detailed visualization, you may need to make a fast and confident decision. *syngo*.CT Coronary Analysis features robust segmentation of the coronary vessels and provides comprehensive visualization of the coronary tree, despite high-grade stenoses. You can reliably assess the case and make a sound decision – even when time is tight.

[1] Data on file. Results may vary.





Comprehensive global and local ventricular analysis

syngo.CT Cardiac Function

syngo.CT Cardiac Function provides fully automatic evaluation of left and right[2] ventricular function. The automatic pre-processing has the data ready for functional evaluation as soon as the case is opened. The ventricles are automatically segmented and the software provides all relevant information for local and global function assessment. For an in-depth evaluation of the cardiac function, the software automatically calculates the global parameters of ejection fraction, myocardial mass, stroke volume, end-systolic and end-diastolic volumes. The local parameters of wall motion and wall thickness are displayed in 17-segment 2D polar maps in accordance with the American Heart Association (AHA). The assessment of congestive heart failure is facilitated. The dedicated visualization of first pass enhancement[2] highlights ischemia and yields valuable information on the effects of a stenosis. The late enhancement feature[2] helps to categorize perfusion defects as viable or non-viable.

[2] Optional

No bones – fast evaluation

syngo.CT Neuro DSA

In neurovascular disease evaluation and interventional treatment planning, *syngo*.CT Neuro DSA (digital subtraction angiography) helps you save both time and effort. Thanks to fully automated bone removal, you'll find your images ready for reading when you open a case. The CT neurovascular workflow also permits a comprehensive vessel analysis of the head and neck – including curved planar reformations (CPR) for stenosis measurement and automated vessel tracking.

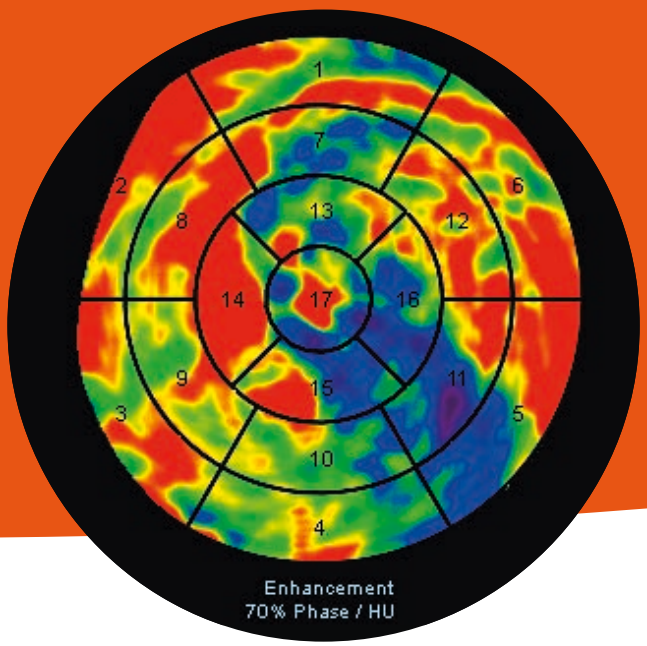
How big is the infarct?

syngo.CT Neuro Perfusion

In order to reliably determine the size of the infarct, you need to assess the entire area affected by the stroke. Siemens Healthineers' scanners equipped with its Adaptive 4D Spiral offers whole-brain perfusion coverage. The guided workflow provided by *syngo*.CT Neuro Perfusion facilitates routine 24/7 operation. It takes just five simple steps to view the core infarct and penumbra. Tissue at risk can be visualized easily in 3D color maps based on the mismatch between blood volume (CBV) and flow (CBF). Alternatively, you can define a custom mismatch based on parameters you select.

Acute Care

Engine Pro



Visualization of ischemia from early or late enhanced image

syngo.CT Cardiac Function – Enhancement

A simple first-pass enhancement scan may not yield the decisive information necessary to determine the hemodynamic relevance of an intermediate stenosis: sub-optimal scan timing may decrease the attenuation difference between healthy and diseased myocardium. A quantitative assessment of a possible perfusion defect is not possible. The Perfusion Evaluation task enables the simultaneous assessment of Dual Energy and quantitative dynamic myocardial perfusion data[3]. An additional clinical benefit is introduced with the quantification of iodine concentration in the myocardium as well as the inspection of quantitative blood flow and volume data. The visualization in AHA-compliant 17-segment polar maps and the direct overlay in MPR segments help to pinpoint the perfusion defect.

[3] *syngo*.CT DE Heart PBV and/or *syngo*.CT Myocardial Perfusion – Myocardium required

Zero-click tracing of the main general vessels

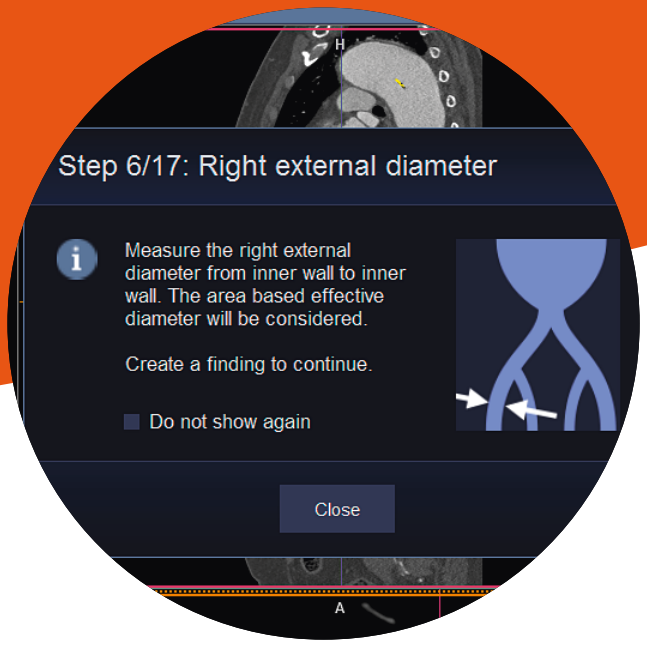
syngo.CT Vascular Analysis – Autotracer

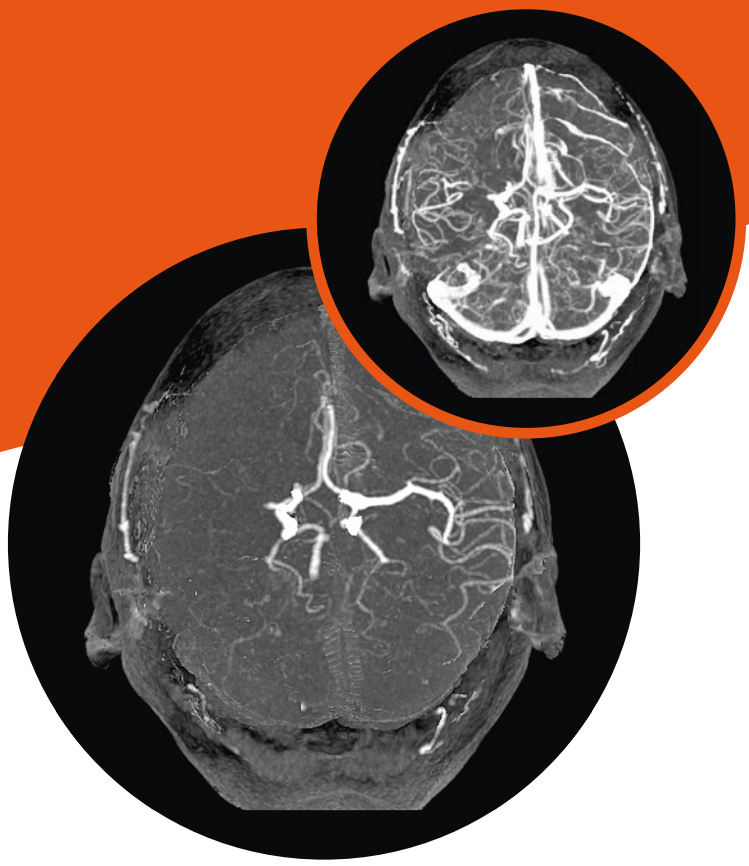
The Autotracer allows for the automatic identification, anatomical labeling, and centerline extraction of main vessels – even before the case is opened. This applies to major blood vessels such as the internal and external carotid arteries, the aorta, and the renal as well as the iliac arteries.

Right ventricular analysis – even with MinDose data

syngo.CT Cardiac Function – Right Ventricle

The right ventricle (RV) makes an essential contribution to normal cardiac pump function due to ventricular interdependence. Therefore, the reproducible assessment and evaluation of the right ventricular function are self-evident and should be considered during clinical management and treatment. *syngo*.CT Cardiac Function – Right Ventricle allows reading and diagnosing CT angiography images of the heart to evaluate right ventricular function, even with MinDose data.





Automatic completion of manufacturer-specific graft order forms

syngo.CT Rapid Stent Planning

Pre-procedural planning for the treatment of abdominal and thoracic aortic aneurysms (AAA and TAA) requires a precise assessment of several anatomical parameters. Numerous vendors offer various stent grafts, each of which requires its own set of measurements. Manually completing graft order forms can be both tedious and time-consuming. *syngo*.CT Rapid Stent Planning introduces the automatic completion of manufacturer-specific stent order forms. This optional extension effectively utilizes our unique Rapid Results Technology. Protocols guide the user through all length and diameter measurements, which are then automatically stored in the corresponding order form. At delivery, *syngo*.CT Rapid Stent Planning provides three order forms: Gore® Excluder®, Zenith Flex®, and Medtronic Endurant in PDF format. In addition, new order form templates can be generated to match the requirements of other vendors.[4]

[4] Adobe Acrobat Professional required

What is the size and location of the clot?

syngo.CT Dynamic Angio

Detecting the occlusion is essential to planning interventional clot retrieval. This is because a larger clot burden is associated with a more challenging intervention and poorer patient outcome[5]. The size of the clot may be overestimated on axial CT angiography (CTA) source images. *syngo*.CT Dynamic Angio can help you better characterize the clot using temporal maximum-intensity projection (tMIP) images[6]. Recent studies demonstrated that this application allows for the more precise measurement of the occlusion length than single-phase CTA[7]. Videos showing the flow of contrast from the arteries to the veins enable dynamic evaluation so you can see antegrade and delayed collateral blood flow[7-9].

[5] Riedel CH et al. Stroke. 2011, 42:1775-7.

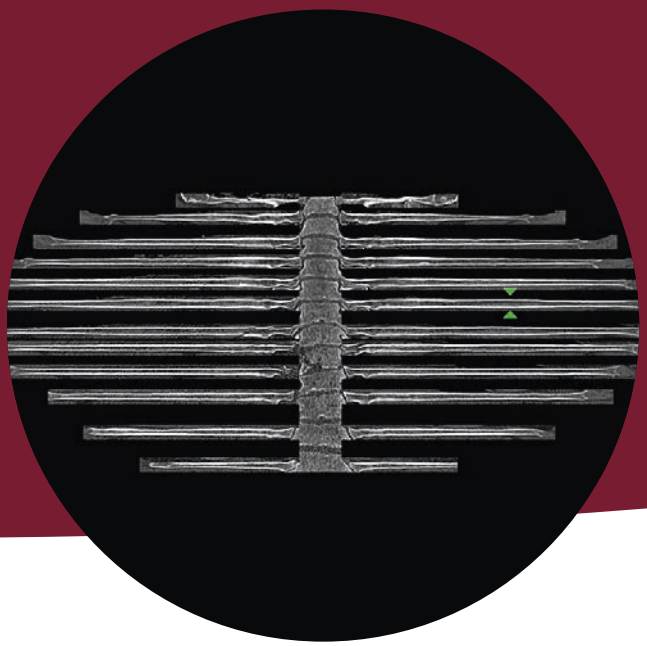
[6] Froelich AM et al. Stroke. 2012 Nov, 43(11):2974-9.

[7] Froelich AM et al. AJNR Am J Neuroradiol. Published online before print, April 25, 2013.

[8] Smith EJ et al. Radiology. 2012, 263:216-25.

[9] Froelich AM et al. Stroke. 2012, 43:97-102.

Options



The revolution for rib and spine assessment

syngo.CT Bone Reading

In acute care scenarios, unconscious or severely injured patients must be scanned quickly. Here the "golden hour" to diagnosis mandates precise localization and identification of critical injuries. Multiple trauma cases with suspected injuries to the thorax and spine call for a complete evaluation of the ribs and vertebral bodies to assess possible fractures. Simply scrolling through axial slices and trying to maintain a focus on the areas of interest can be very time-consuming because of the ribs' oblique orientation. *syngo*.CT Bone Reading revolutionizes rib and spine assessment. The application identifies and labels the ribs and displays the entire rib cage rolled on a 2D planar format.

In addition, the vertebral bodies are tagged and the spine is presented in a stretched view for a straightforward overview of the anatomy. The planar display of the rib cage and spine facilitates the direct detection of lesions. Fractures can now be spotted and assessed immediately, saving precious minutes in situations where time is tight. Choose a new method of reading that is as simple as it is effective. *syngo*.CT Bone Reading – for increased speed in bone assessment.

Make communication with referrers and patients clear and convincing

syngo.via Cinematic VRT[10]

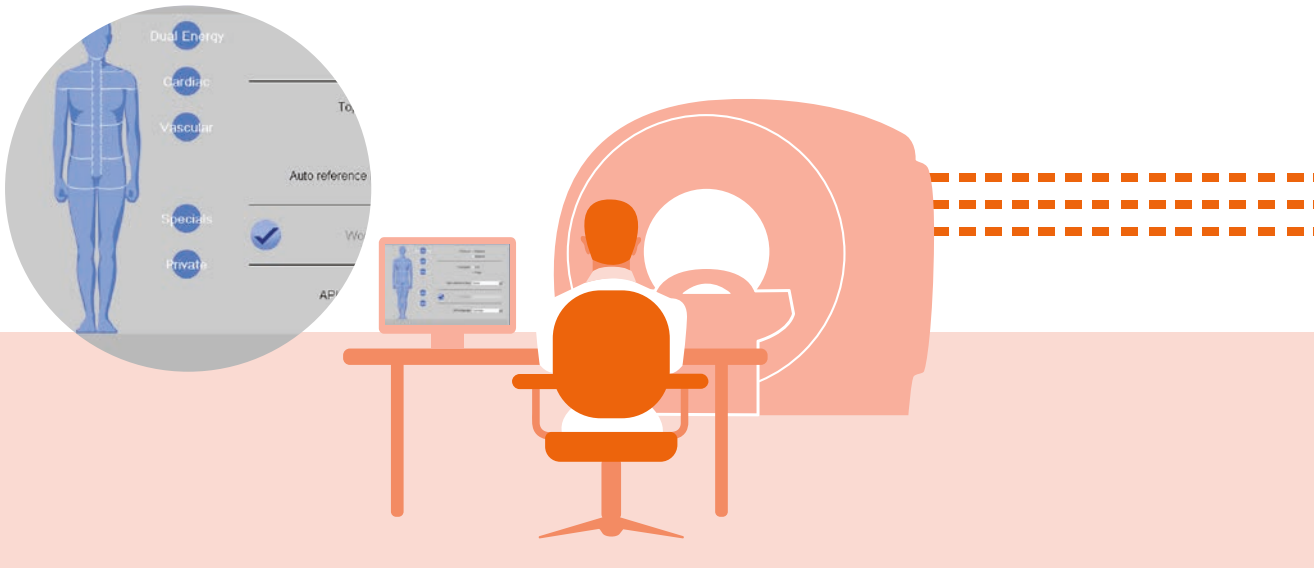
With a single click, you can generate in a few seconds photo-realistic clinical images just like from an anatomy textbook. You can use this material for education, publication, and communication – especially with your referrers and patients. From pure geometric optic to electromagnetic modeling of ambient light: Cinematic Rendering is based on a physically accurate simulation of how light interacts with matter. In contrast to the traditional volume rendering technique (VRT), which traces a single straight ray through each pixel into the volume data ("ray casting"), Cinematic VRT traces hundreds or thousands of photon paths per pixel through the captured patient anatomy. This increases the realism of the resulting images tremendously, and allows for artistic techniques to produce descriptive visualizations of the human anatomy. 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. Therefore, it provides a realistic rendering of shapes and scattering, subsurface scattering and depth. This promotes easier interpretation by the human brain, a much faster understanding of spatial anatomical structures, and the presentation of a virtual human anat-omy that almost explains itself.

[10] Cinematic VRT is recommended for communication, education, and publication purposes and not intended for diagnostic reading.

Reading as simple as it should be

Rapid Results for Acute Care

SOMATOM CT scanner



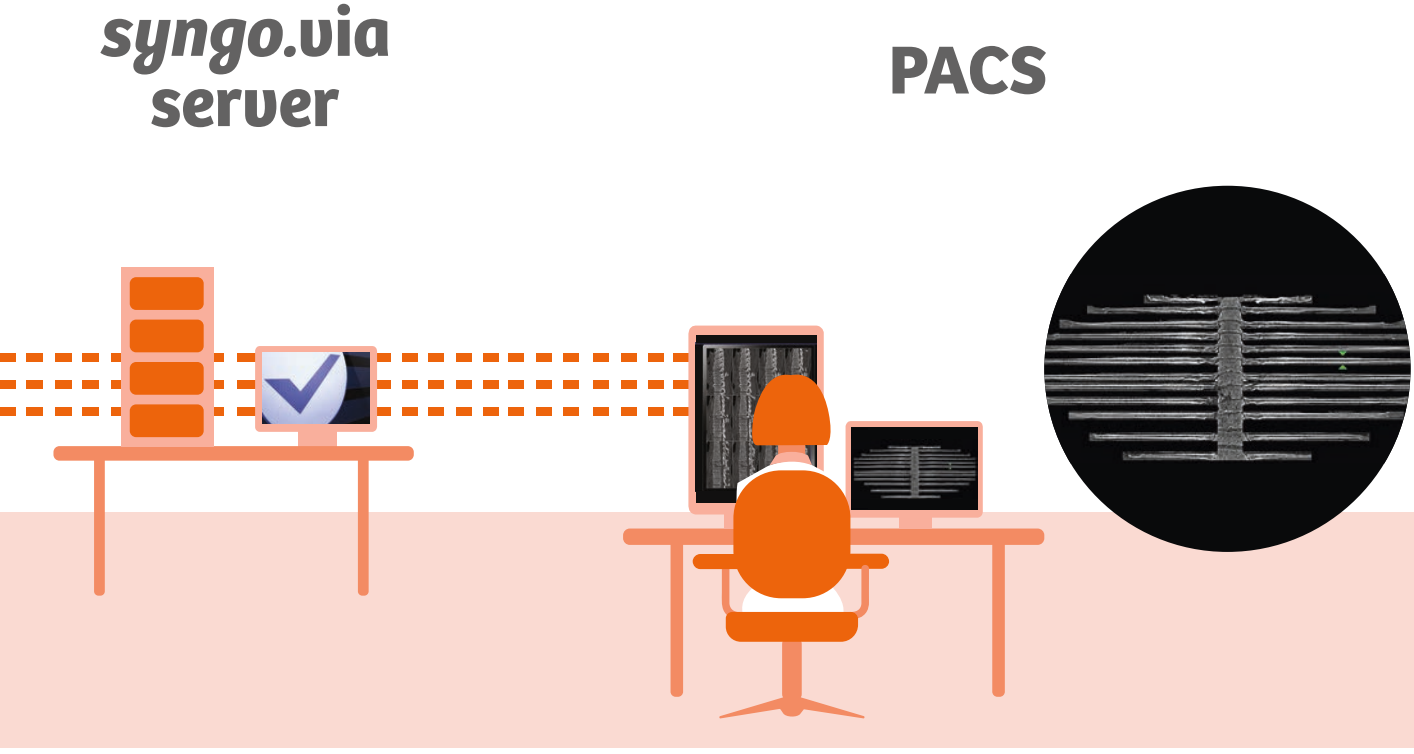
Why waste time in CT post-processing?

Rapid Results improves your efficiency by reducing your workflow steps:

In trauma cases requiring surgical intervention, the orthopedic surgeon usually requires several standardized views of the affected region to aid in a comprehensive pre-procedural workup. While in stroke imaging, standardized perfusion maps are often needed for a quick assessment of possible penumbra areas for intervention planning.

The generation of these different anatomical orientations and perfusion maps 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 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.



Your Rapid Results benefits with the CT Acute Care Engine:

1. Clinical innovations like Bone Reading or Neuro Perfusion for routine exams regardless of expertise level
2. Standardized and consistent image quality independent of operator
3. Post-processing becomes part of the standard reconstruction task
4. Ready-to-read results wherever you want them

Clinical cases: Courtesy of University of Erlangen, Erlangen, Germany; UMM, Mannheim, Germany; and Cardioangiologisches Centrum Bethanien, Frankfurt, Germany.

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