

**syngo.via**  
**VB20**  
Version



Get further.  
With the CT  
**Neuro Engine.**



# 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**

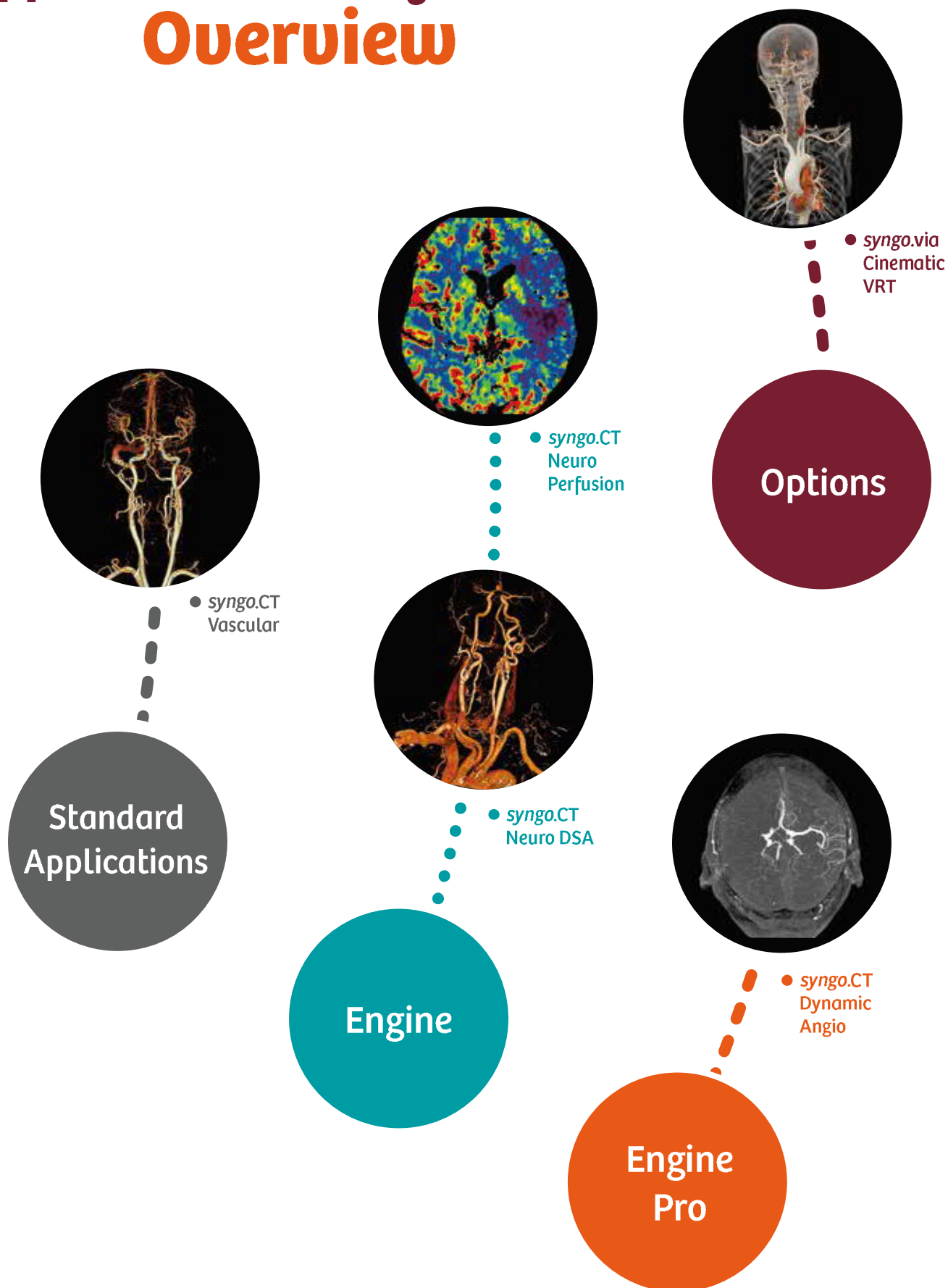
Achieve leading door-to-needle times in stroke diagnosis by answering the key questions with high precision and speed

with a complete diagnostic stroke solution in *syngo.via*: Exclude bleeding, evaluate the size and location of the occlusion, and assess core infarct and penumbra with outstanding imaging possibilities.

## **Deliver to the point**

New, but unimaginable: The current VB20 Version comes with an innovative Auto Stroke feature empowered by Rapid Results to improve efficiency, save time and achieve standardized results.

# CT Neuro Applications and Engines Overview



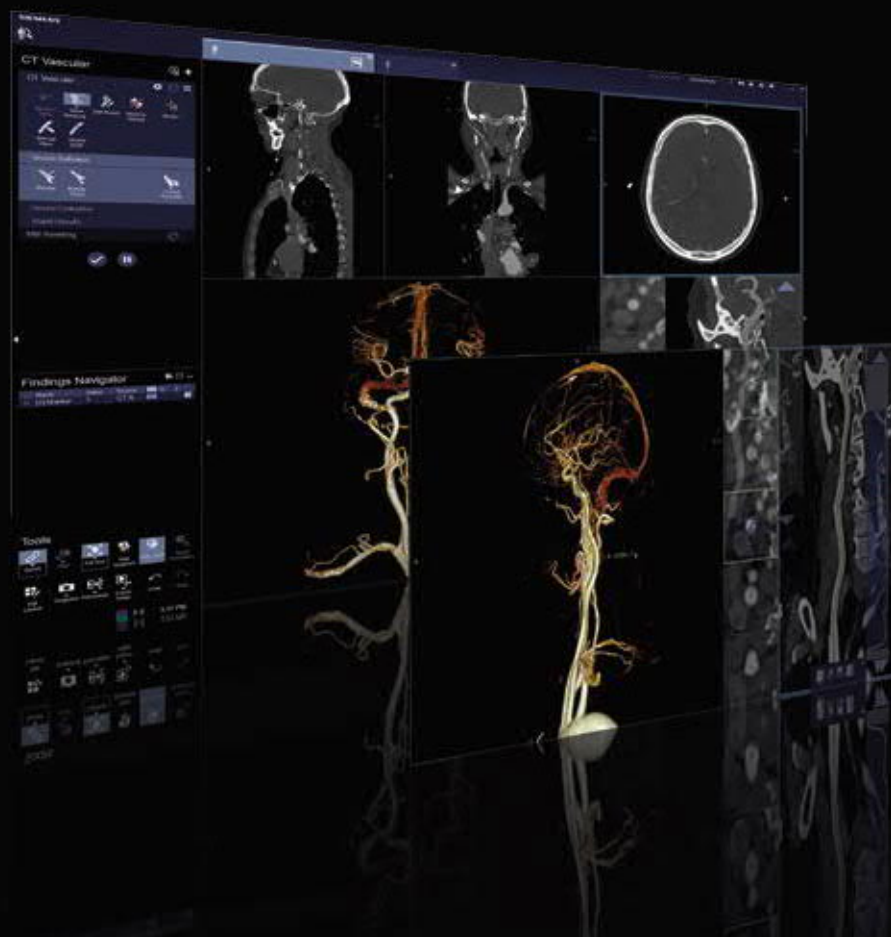
**Neuro**

# Standard Applications

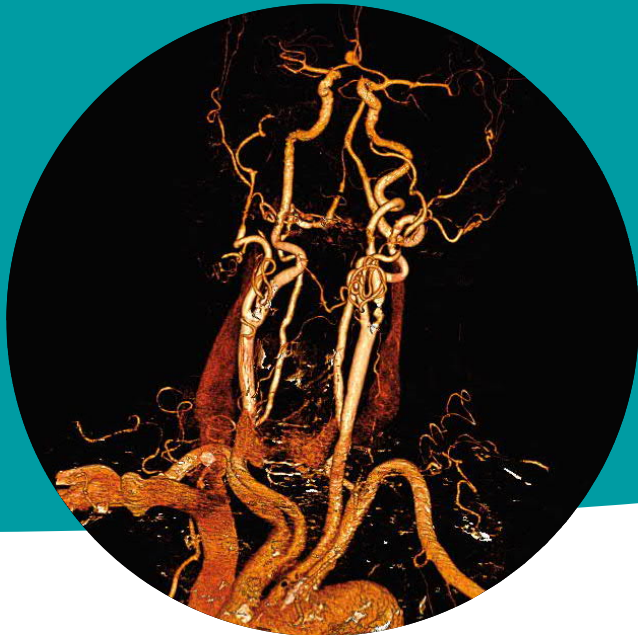
Based on many conversations with healthcare professionals, we have identified which functionalities are essential for everyday clinical assessment. Neuro Standard Applications bundle exactly those features that will additionally help you to speed up your routine neuro assessment.

## *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



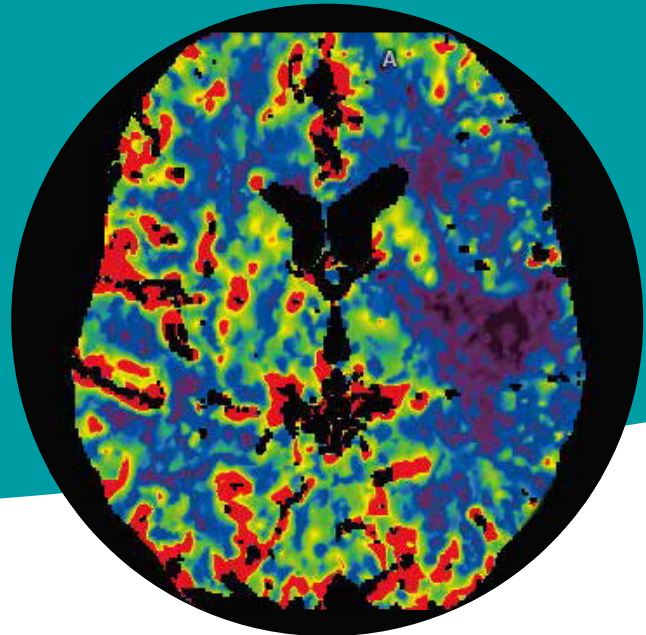
# Neuro Engine



## 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. You can also toggle between bone and vessel views.

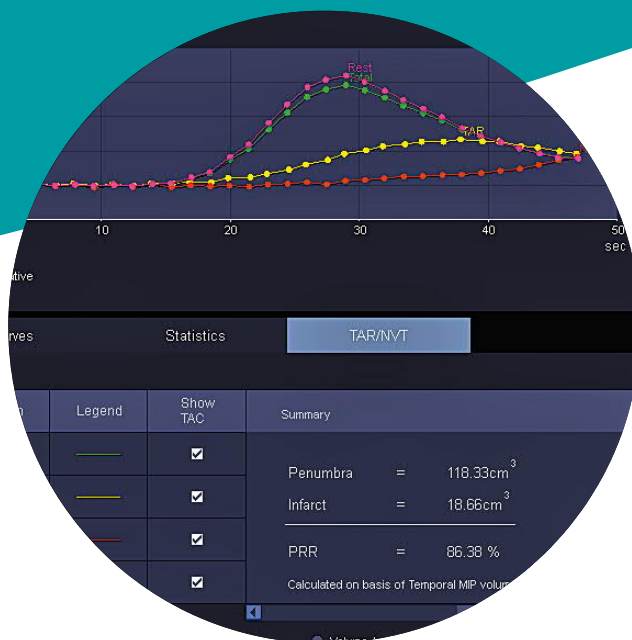
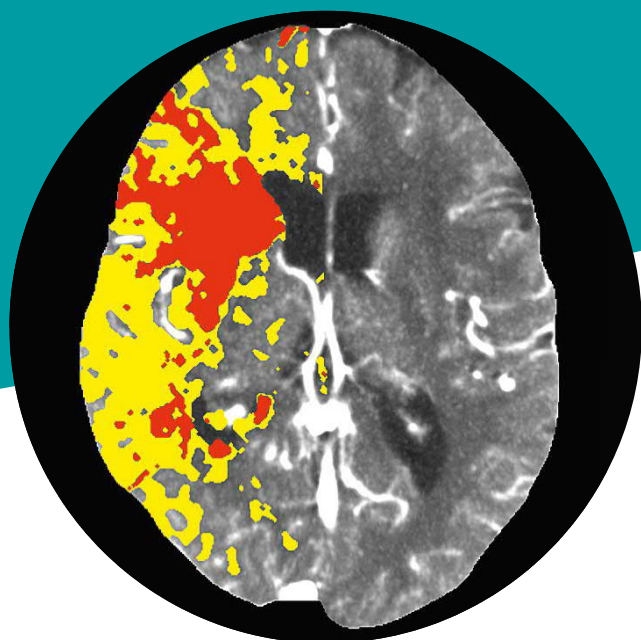
The CT neurovascular workflow also permits a comprehensive vessel analysis of the head and neck – including curved planar reformations (CPR) for stenosis measurement and automated vessel tracking.



## 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 blood flow (CBF). Alternatively, you can define a custom mismatch based on parameters you select. For example, Siemens Healthineers' Time To Drain (TTD) shows potential for assessing early ischemia. Refined algorithms offer automated gray matter segmentation so you can immediately focus on this task.



Decisions in acute stroke treatment can be facilitated by imaging techniques that detect not only the acute perfusion deficit including the area of the so-called “tissue at risk”, but which also predict final infarct volume. In general, brain tissue presenting both a low blood flow and a low blood volume is considered as non-viable tissue: These neurons are also called the “infarct core”. Brain tissue presenting low blood flow but still normal or even increased values of blood volume indicate that intravenous medication can still reach that tissue. These neurons are called penumbra or “tissue at risk”<sup>1</sup>.

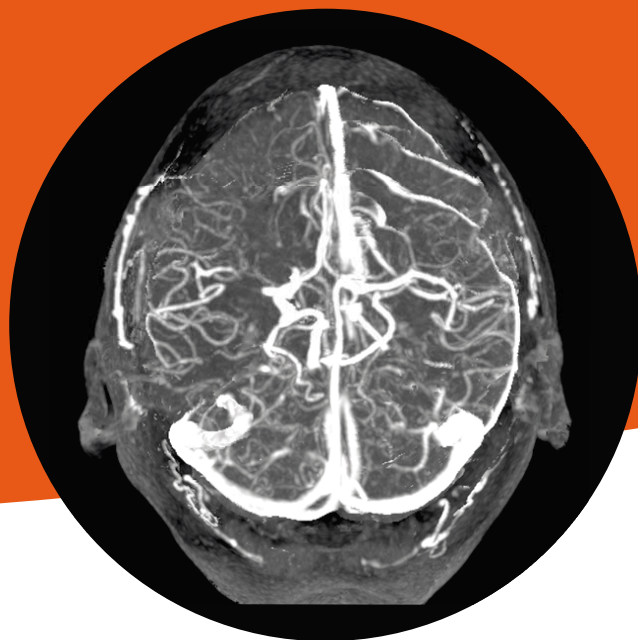
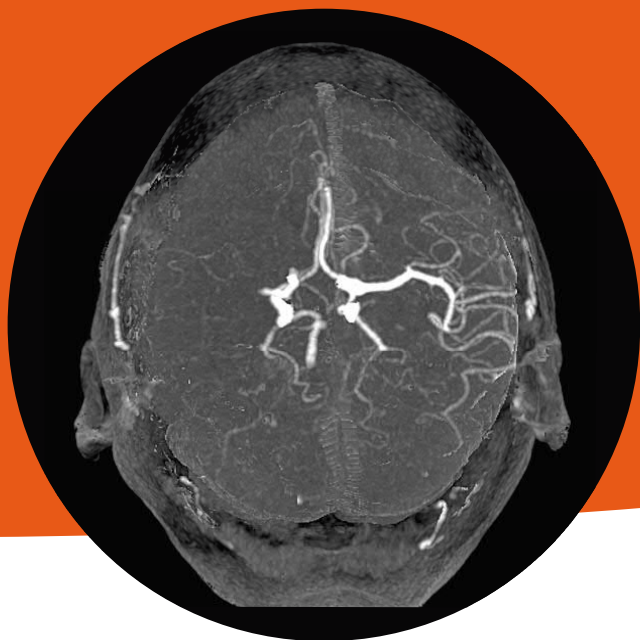
The penumbra evaluation tool helps the user to distinguish between these two regions by defining respective threshold perfusion values that can be color-coded in either the whole stroke hemisphere or just the included gray matter. Furthermore, quantitative information are provided, together with relative time attenuation curves. Volume of penumbra, infarct, and perfusion recuperation fraction (i.e., the ratio between the volume of penumbra and the total affected volume) are automatically calculated, which can help the physician to weigh the risk of intracranial hemorrhage against the potential benefit of intravenous or intraarterial thrombolytic therapy.

syngo.CT Neuro Perfusion enables a quantitative and qualitative evaluation of the perfusion results. It is possible to draw regions of interest (ROIs), mirror these ROIs on the contralateral hemisphere, and compare the values for every parameter. Quantitative images of all important parameters such as cerebral blood flow (CBF), cerebral blood volume (CBV) and time to peak (TTP) etc., are provided.

These parameter images are based on two calculation models that can be selected in the configuration panel: the deconvolution model and the maximum slope model<sup>2</sup>. This gives the user both the possibility to use the deconvolution model as the default, which offers more perfusion metrics, but also the flexibility to revert to the maximum slope model to salvage data sets with motion.

Neuro

# Engine Pro



**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<sup>3</sup>. The size of the clot may be overestimated on axial CTA source images. *syngo.CT Dynamic Angio* can help you better characterize the clot using temporal maximum intensity projection (tMIP) images<sup>4</sup>. Recent studies demonstrated that this application allows for the more precise measurement of the occlusion length than single-phase CTA<sup>5</sup>. 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<sup>5-7</sup>.

For evaluating local vessel or tissue enhancement, *syngo.CT Dynamic Angio* displays ROI-specific time attenuation curves, as well as curve and statistical parameters, such as time to peak and peak enhancement. For a phase-specific evaluation, for example of the arterial or venous phase, the Twin Slider can restrict calculation of new CT volumes to any user defined time range within the dynamic scan. This means that the application may also be used for examining the liver, or abdominal aortic stent patency and endovascular leakage.

Neuro

# Options

**New****New**

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

## **syngo.via Cinematic VRT**

With a single click and in a few seconds, you can generate photorealistic clinical images just like out of 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<sup>®</sup> 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 anatomy that almost explains itself.

Reading as simple as it should be

# Rapid Results for Neuro Perfusion

## SOMATOM CT scanner



**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.

### **Rapid Results – reloaded with *syngo.via* VB20**

Rapid Results in Neuro Perfusion saves your time by providing you a standardized AutoStroke workflow where all required results will be automatically created and available right away in *syngo.via* for further evaluation. It enables total user independence. Furthermore, Rapid Results can also help you make Neuro Perfusion routine

without changing your clinical workflows by automatically sending all perfusion maps to the PACS. Rapid Results will automatically generate standard visualizations of different anatomies in any required orientation and thickness. Just define your workflow once and let Rapid Results produce the decision basis. Equipped with Rapid Results, you are prepared for an emergency – e.g., at night, when experienced operators may not be available.

**syngo.via  
server**

**PACS**



## Your benefits with Rapid Results:

**1**

Clinical innovations like CT 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.

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#### **Siemens Healthineers Headquarters**

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

<sup>1</sup> Astrup J. et al. Thresholds in cerebral ischemia – the ischemic penumbra. *Stroke*. 1981, 12: 723-725.

<sup>2</sup> Abels B. et al. Perfusion CT in acute ischemic stroke: a qualitative and quantitative comparison of deconvolution and maximum slope approach. *AJNR*. 2010, 31: 1690-8.

<sup>3</sup> Riedel, Christian H., et al. „The Importance of Size.“ *Stroke* 42.6 (2011): 1775-1777.

<sup>4</sup> Frölich, Andreas MJ, et al. „Antegrade flow across incomplete vessel occlusions can be distinguished from retrograde collateral flow using 4-dimensional computed tomographic angiography.“ *Stroke* 43.11 (2012): 2974-2979.

<sup>5</sup> Frölich, A. M. J., Schrader, D., Klotz, E., Schramm, R., Wasser, K., Knauth, M., & Schramm, P. (2013). 4D CT angiography more closely defines intracranial thrombus burden than single-phase CT angiography. *American Journal of Neuroradiology*, 34(10), 1908-1913.

<sup>6</sup> Smith EJ, Vonken E, van der Schaaf IC, Mendrik AM, Dankbaar JW, Horsch AD, van Seeters T, van Ginneken B, Prokop M. Timing-invariant reconstruction for deriving high-quality CT angiographic data from cerebral CT perfusion data. *Radiology*. 2012; 263:216-25.

<sup>7</sup> Frölich, Andreas MJ, et al. „Angiographic reconstructions from whole-brain perfusion CT for the detection of large vessel occlusion in acute stroke.“ *Stroke* 43.1 (2012): 97-102.

<sup>8</sup> Cinematic VRT is recommended for communication, education, and publication purposes and not intended for diagnostic reading.