

# Ultrafast CTA: How Can It Help in Planning Endovascular Procedures?

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*Jacques Busquet, MD, Paris, France*

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The ideal modality for vascular imaging would be noninvasive, informative and inexpensive. In that way, computed tomographic angiography (CTA) is becoming an established imaging modality in diagnosis, treatment planning and postoperative follow-up of peripheral obstructive vascular diseases. This evolving technique provides a less invasive angiographic global assessment of arterial lesions than conventional digital subtraction angiography (DSA), providing accurate visualization on localization, structural anatomy and extension of occlusive disease. CTA is also used in routine follow-up studies after stent and stent graft implantation without any dephasing effect often seen in magnetic resonance examination.

The introduction of three-dimensional multislice or multidetector helical ultrafast CTA has improved dramatically the imaging of the aorta and also allows a perfect evaluation of smaller arterial vessels. This new development has favored the use of CTA in the planning of interventional procedures, with several specific advantages compared to conventional angiography such as precise information concerning the vessel lumen and wall, such as wall hematoma, or dissecting plaque. The high sensitivity for calcified plaques gives the exact anatomical characterization of the potential arterial stenosis, allowing an optimized interventional strategy (balloon diameter, type of stent, balloon-expandable or self-expanding, length, and risk of rupture). Multiplanar three-dimensional reconstructions render multiangular global views of the arterial tree, allowing better preoperative strategy and reducing per-procedural contrast media diagnostic injection. CTA offers the possibility to examine the entire aorta in 30 seconds in a single breath hold. Nevertheless, an efficient examination should be reduced to either thoracic or abdominal aortic segments in order to optimize the reconstruction parameters. Regarding endovascular repair of thoracic and abdominal aortic aneurysm using stent graft systems, CTA has become the imaging modality of choice for both preoperative assessment (neck diameter and morphology, automated calibration) and postoperative follow-up (endoleaks). Concerning carotid artery stenosis, CTA is able to identify plaque characteristics more readily than duplex sonography or arteriography and to differentiate critical stenosis from occlusion.

Finally, the latest comparative studies demonstrate an almost similar reliability between CTA and conventional DSA. For planning interventional procedures, CTA is acceptable in most cases but requires optimized equipment and accurate examination technique for high-quality imaging and optimal decision making.

## References

1. Adriaensen M, Kock M, Stijnen T, et al. Peripheral arterial disease: therapeutic confidence of CT versus digital subtraction angiography and effects on additional imaging recommendations. *Radiology* 2004;233:385-91.
2. Katz DS, Hon M. CT angiography of the lower extremities and aortoiliac system with multidetector row helical CT scanner: promise of new opportunities fulfilled. *Radiology* 2001;221:7-10.
3. Rubin GD. MDCT Imaging of the aorta and peripheral vessels. *Eur J Radiol* 2003;45:42-9.