CT perfusion can delineate lacunar infarcts in acute stroke calls

Albert H. Chiu, FRANZCR

Graeme J. Hankey, FRACP

David J. Blacker, FRACP

William McAuliffe, FRANZCR

Lacunar infarction accounts for approximately one quarter of all ischemic strokes but can be difficult to diagnose on noncontrast CT and clinical grounds.¹ Diffusion-weighted imaging MRI has traditionally been considered the optimal modality for imaging confirmation¹ but can be difficult to obtain acutely. CT perfusion has been increasingly used in hyperacute stroke and has shown promise in improving detection of lacunar infarcts.² We present 4 patients in whom CT perfusion was performed using a 320-slice scanner (Aquilion ONE Vision, Toshiba, Japan) and Ultravist 370 (iopromide, Bayer, Switzerland) injected at 4 mL/s for 50 mL. Multiplanar reconstruction of perfusion data was performed using commercially available software (Vitrea 6.6.2036.1, Vital Images, Minnetonka, MN). Time from stroke onset to CT perfusion is presented in the table.

Patient 1 is an 82-year-old woman who developed left hemiparesis, facial droop, and dysarthria without sensory signs. Patient 2 is a 72-year-old woman who presented with right arm and leg weakness and dysarthria. Patient 3 is a 62-year-old man presenting with left hemiparesis and left upper quadrantanopia, without sensory deficit or neglect. Patient 4 is a 75-year-old man presenting with left pure sensory neglect with no motor deficit. None of the 4 patients was thrombolysed, the first 2 due to hypertension, and the third due to unclear time of onset, which could only be clarified after thrombolysis window.

Table Time from stroke onset to CT perfusion for each patient

Patient	Time from stroke onset to CT perfusion
1	1 h 45 min
2	1 h 51 min
3	2 h 56 min
4	6 h 8 min

Neurological Intervention and Imaging Service of WA (NIISwa) (AHC, WM); Department of Neurology (GJH, DJB), Sir Charles Gairdner Hospital; School of Medicine & Pharmacology (GJH), University of Western Australia; and Western Australian Neuroscience Research Institute (DJB), Perth, Australia.

Funding information and disclosures are provided at the end of the article. Full disclosure form information provided by the authors is available with the **full text of this article** at Neurology.org/cp.

Correspondence to: albert.h.chiu@gmail.com

Figure Patients shown by rows

(A) Correlating noncontrast CT image. (B, C) Axial and coronal time-to-peak maps of CT perfusion study. Lesions are marked by arrows. (D) Allows comparison to axial diffusion-weighted imaging MRI and (E) coronal fluid-attenuated inversion recovery MRI. Scan orientation may be altered between studies and due to patient movement.

MRI confirmed the ischemic lesions seen on CT perfusion (figure). Our cases demonstrate that many lacunar infarcts can be seen on CT perfusion, and newer systems allow multiplanar reconstructions of volumetric data, allowing for more confident prospective diagnosis.

REFERENCES

1. Wessels T, Röttger C, Jauss M, et al. Identification of embolic stroke patterns by diffusion-weighted MRI in clinically defined lacunar stroke syndromes. *Stroke* 2005;36:757–761.
2. Das T, Settecase F, Boulos M, et al. Multimodal CT provides improved performance for lacunar infarct detection. *AJNR Am J Neuroradiol* 2015;36:1069–1075.

AUTHOR CONTRIBUTIONS

A.H. Chiu drafted the manuscript and interpreted the imaging. All authors contributed to the conceptualization, patient management, and revision of the manuscript and give approval of the version submitted for publication.

STUDY FUNDING

No targeted funding reported.

DISCLOSURES

A.H. Chiu reports attendance at industry-supported meetings, including Neuroexchange, an official interventional neuroradiologist–led morbidity and mortality meeting for Australia and New Zealand practitioners, in which all devices from all companies are discussed freely. This meeting runs every year and is open to all practicing Australian and New Zealand interventional neuroradiologists and fellows. Covidien supplies an economy return ticket and accommodation. No monies were paid directly to A.H. Chiu or A.H. Chiu’s institution. D.J. Blacker serves as neurology subspecialty editor of *Internal Medicine Journal* and on the editorial board of *Future Neurology*. G.J. Hankey serves on a data safety monitoring board for AC Immune; serves as an Associate Editor for *Stroke Treatment and Prevention*, consulting editor for *International journal of Stroke*, editorial consultant for *The Lancet* and *The Lancet Neurology*, and on the editorial boards of *Stroke* and *Cerebrovascular Diseases*; serves on speakers’ bureaus for Bayer and theheart.org; and has received honoraria for lecturing at a scientific symposium on anticoagulation for atrial fibrillation at European Stroke Conference, Nice, 2014, sponsored by Bayer, and for participating in a panel discussion on atrial fibrillation registries for theheart.org, sponsored by Medscape. W. McAuliffe reports attendance at industry-supported meetings, including Neuroexchange, an official interventional neuroradiologist–led morbidity and mortality meeting for Australia and New Zealand practitioners, in which all devices from all companies are discussed freely. This meeting runs every year and is open to all practicing Australian and New Zealand interventional neuroradiologists and fellows. Covidien supplies an economy return ticket and accommodation. No monies were paid directly to W. McAuliffe or W. McAuliffe’s institution. Full disclosure form information provided by the authors is available with the **full text of this article at Neurology.org/cp**.

Get Clinical Practice Content Sooner

What you **do** know: *Neurology*® *Clinical Practice* publishes 6 times per year.

What you **might not** know: *Neurology*® *Clinical Practice* now publishes content **online ahead of print!**

- Get your message to our readers sooner
- Receive the latest clinical and health policy updates more often
- Sign up to receive **Publish Ahead of Print alerts**