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J. Mackey, P. Khatri, J.P. Broderick and for the IMS III
Investigators

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Increasing Use of CT Angiography in Interventional Study Sites: The IMS III Experience

The use of multimodal CT scanning—CT angiography (CTA) and CT perfusion (CTP)—to assess patients with acute stroke seems to have increased rapidly during the past 5 years. This change in clinical practice may affect the speed of acute treatment, methods of triaging to intra-arterial treatment, and the process of subject selection in ongoing acute stroke trials. Additionally, recent reports have highlighted unintended radiation overdoses in patients with acute stroke undergoing CTP.^{1,2} We characterize the frequency of emergent CT assessment among 53 sites in the Interventional Management of Stroke III (IMS III) Trial.

The IMS III Trial is comparing combined intravenous/intra-arterial treatment with standard intravenous tissue plasminogen activator (tPA) initiated within 3 hours of onset in patients with ischemic stroke with a National Institutes of Health Stroke Scale score of ≥ 10 . Only routine noncontrast CT is required at baseline, though CTA and CTP are allowed if they are part of the standard of care of the institution and are approved by the coordinating center. At the study initiation in 2006, a small number of centers used CTA routinely at baseline for assessment of patients with acute stroke. The impression of a change in practice regarding CTA use during the past several years prompted a survey of all approved IMS III investigational sites in the United States, Canada, and Australia in November 2008. The survey consisted of the following questions:

1. Does your site use CTA/MR angiography for the initial evaluation of stroke patients?
 - A) Yes, as standard of care.
 - B) Used variably depending on the physician or other circumstances.
 - C) No, never or rarely used at baseline.
2. Is the CTP part of your pretreatment imaging evaluation in addition to CTA?
3. Do you have additional comments regarding CTA use?

Of the 53 IMS III treatment centers approved at that point, of which 29 (55%) were academic centers, CTA was performed as the standard of care for all patients with acute ischemic stroke in 24 centers (45%), was variably used in an additional 22 centers (42%), and was not used as part of the standard stroke evaluation in 5 centers (9%). Two centers (4%) did not respond. Only 2 sites specifically reported using MR angiography as opposed to CTA. CTP was performed as standard of care in 18 centers (34%), was variably used in 10 centers (19%), and was not used as part of the standard stroke protocol in 17 centers (32%). Eight centers (15%) did not respond. Community hospitals were as likely to use CTA and CTP as academic centers were.

Multimodal CT use has rapidly expanded at stroke centers that participate in interventional acute stroke trials and was part of the standard of care at nearly half of the IMS III centers. The impact of its increased use on time to treatment for both intravenous tPA and intra-arterial therapies, subject selection and enrollment into trials, potential adverse events associated with contrast use (particularly in those patients who also undergo angiography), cost of stroke care, and adherence to quality assurance standards regarding radiation exposure warrants careful study.

References

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2. Zarembo A. **Hospital error leads to 206 radiation overdoses.** *Los Angeles Times*. October 13, 2009:A3

J. Mackey

P. Khatri

J.P. Broderick,

for the IMS III Investigators

Department of Neurology

University of Cincinnati College of Medicine

Cincinnati, Ohio

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