



**TITLE: Computed Tomography Angiography for Diagnosis of Stroke or Transient Ischemic Attack: Clinical Effectiveness**

**DATE:** 25 July 2016

**RESEARCH QUESTION**

What is the clinical effectiveness of computed tomography angiography for the diagnosis of patients presenting with symptoms of stroke or transient ischemic attack?

**KEY FINDINGS**

Two systematic review with meta-analyses, one systematic review, one comparative study with meta-analysis, and three non-randomized studies were identified regarding computed tomography angiography for the diagnosis of stroke or transient ischemic attack.

**METHODS**

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, and randomized controlled trials; a very focused search was done for non-randomized studies. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2011 and July 14, 2016. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

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## SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

<b>Population</b>	Adult patients (age >18 years) presenting with possible stroke or transient ischemic attack (TIA)
<b>Intervention</b>	Computed tomography angiography (CTA)
<b>Comparators</b>	<ul style="list-style-type: none"> <li>• Non-contrast computed tomography (NCCT);</li> <li>• Magnetic resonance imaging (MRI);</li> <li>• Digital ultrasonic system (DUS);</li> <li>• Magnetic resonance angiography (MRA) imaging;</li> <li>• No imaging;</li> <li>• No comparator</li> </ul>
<b>Outcomes</b>	Clinical effectiveness (e.g., but not limited to, diagnosis, subsequent stroke, mortality, repeat hospital or emergency department visits, disability)
<b>Study Designs</b>	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies

## RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

Two systematic review with meta-analyses, one systematic review, one comparative study with meta-analysis, and three non-randomized studies were identified regarding computed tomography angiography for the diagnosis of stroke or transient ischemic attack. No relevant health technology assessments were identified.

Additional references of potential interest are provided in the appendix.

## OVERALL SUMMARY OF FINDINGS

One meta-analysis<sup>1</sup> (stratified by whether computed tomography angiography (CTA) was used to select patients) confirmed the importance of imaging selection prior to endovascular therapy. The authors reported that the functional benefit of endovascular therapy was significantly greater with CTA-based selection than those without.<sup>1</sup> One systematic review<sup>2</sup> evaluated the diagnostic test accuracy of CTA and magnetic resonance angiography (MRA) versus intra-arterial digital subtraction angiography for the detection of intracranial vascular malformations as a cause of intracerebral hemorrhage. The authors reported that both CTA and MRA failed to reveal a statistically significant difference in sensitivity or specificity between the two imaging modalities.<sup>2</sup> The comparative study with a meta-analysis<sup>3</sup> examined the diagnostic value of CTA for detecting vascular abnormalities in patients with spontaneous intracerebral hemorrhage. The authors reported that CTA should be performed as the initial vascular investigation for patients with acute spontaneous intracerebral hemorrhage.<sup>3</sup> Another systematic review with meta-analysis<sup>4</sup> assessed the role of CTA as a primary examination tool for the diagnosis of

intracranial aneurysms in patients with subarachnoid hemorrhage. The authors concluded that multidetector CTA can be used as a primary examination tool in the diagnostic work-up of patients with subarachnoid hemorrhage.<sup>4</sup>

Three non-randomized controlled trials were identified.<sup>5-7</sup> One Canadian study compared the time dependence of reliability of non-contrast computed tomography (CT) with CTA in patients with acute ischemic stroke using the Alberta Stroke Program Early CT (ASPECT) Score.<sup>5</sup> CTA was lower than non-contrast CT at four different time points after stroke onset, with significant differences observed at 0-90 mins and 91-180 mins. Overall, using ASPECT, CTA is more reliable than non-contrast CT at predicting final infarct extent, particularly in the early time window.<sup>5</sup> Another study compared the sensitivity of magnetic resonance imaging (MRI) with CTA for the detection of cerebral artery thrombus in patients with acute stroke.<sup>6</sup> CTA depicted branch occlusion in 31 cases, thrombus was seen on both MRI and CTA in 28 patients, and thrombus was noted in two patients on MRI only, with no corresponding abnormality caught on CTA. Two patients with acute middle cerebral artery thrombus showed no vascular occlusion or thrombus on either CTA or MRI.<sup>6</sup> A retrospective analysis of patients admitted to hospital with spontaneous intracerebral hemorrhage assessed improvements to diagnostic yield and cost effectiveness of CTA in the initial evaluation of spontaneous non-subarachnoid intracerebral hemorrhage.<sup>7</sup> Records were reviewed for medical risk factors, hemorrhage location, and correlation of CTA findings with final diagnosis. The authors concluded that patient characteristics and risk factors are important considerations when ordering diagnostic tests in the workup of non-subarachnoid, non-traumatic spontaneous intracerebral hemorrhage and that CTA can usually be omitted in the workup of patients with these characteristics.<sup>7</sup>

## REFERENCES SUMMARIZED

### Health Technology Assessments

No literature identified.

### Systematic Reviews and Meta-analyses

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### Randomized Controlled Trials

No literature identified.

### Non-Randomized Studies

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**APPENDIX – FURTHER INFORMATION:**

**Previous CADTH Reports**

8. Diagnostic computed tomography angiography for adult patients: safety [Internet]. Ottawa: CADTH; 2014 Mar 12. [cited 2016 Jul 21]. (CADTH rapid response report: summary of abstracts). Available from: <https://www.cadth.ca/diagnostic-computed-tomography-angiography-adult-patients-safety>
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**Systematic Reviews and Meta-analyses – Alternative Comparator**

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**Randomized Controlled Trials**

*Unclear if Combination Therapy or CTA Monotherapy Were Examined*

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## Non-Randomized Studies

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**Clinical Practice Guidelines – Unspecified Methodology**

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**Economic Evaluations**

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