

## Is the Addition of Computed Tomography with Angiography Superior to a Non-Contrast Neuroimaging Only Strategy for Patients with Suspected Stroke or Transient Ischemic Attack Presenting to the Emergency Department?

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**Abstract :** Introduction: Frontline emergency physicians require clear and evidence-based approaches to guide neuroimaging investigations for patients presenting with suspected acute stroke or transient ischemic attack (TIA). Various forms of computed tomography (CT) are currently available for initial investigation, including non-contrast CT (NCCT), CT angiography head and neck (CTA), and CT perfusion (CTP). However, there is uncertainty around optimal imaging choice for cost-effectiveness, particularly for minor or resolved neurological symptoms. In addition to the cost of CTA and CTP testing, there is also a concern for increased incidental findings, which may contribute to the burden of overdiagnosis. Methods: In this cross-sectional observational study, analysis was conducted on 586 anonymized triage and diagnostic imaging (DI) reports for neuroimaging orders completed on patients presenting to adult emergency departments (EDs) with a suspected stroke or TIA from January-December 2019. The primary outcome of interest is the diagnostic yield of NCCT+CTA compared to NCCT alone for patients presenting to urban academic EDs with Canadian Emergency Department Information System (CEDIS) complaints of "symptoms of stroke" (specifically acute stroke and TIA indications). DI reports were coded into 4 pre-specified categories (endorsed by a panel of stroke experts): no abnormalities, clinically significant findings (requiring immediate or follow-up clinical action), incidental findings (not meeting prespecified criteria for clinical significance), and both significant and incidental findings. Standard descriptive statistics were performed. A two-sided p-value <0.05 was considered significant. Results: 75% of patients received NCCT+CTA imaging, 21% received NCCT alone, and 4% received NCCT+CTA+CTP. The diagnostic yield of NCCT+CTA imaging for prespecified clinically significant findings was 24%, compared to only 9% in those who received NCCT alone. The proportion of incidental findings was 30% in the NCCT only group and 32% in the NCCT+CTA group. CTP did not significantly increase the yield of significant or incidental findings. Conclusion: In this cohort of patients presenting with suspected stroke or TIA, an NCCT+CTA neuroimaging strategy had a higher diagnostic yield for clinically significant findings than NCCT alone without significantly increasing the number of incidental findings identified.

**Keywords :** stroke, diagnostic yield, neuroimaging, emergency department, CT

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