
CT Evaluation of Pulmonary Embolism: Optimising Imaging Quality



In the computerised tomography (CT) evaluation of acute pulmonary embolism, an individualised contrast protocol can provide comparable vascular enhancement and image quality to the standard methodology, yet with fewer limitations and lower intravenous contrast volume. These findings are from a new study published in the journal *Medicine*.

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The role of computed tomography angiography (CTA) has been well established in the detection of pulmonary embolism (PE), the third most common cause of cardiovascular death in the U.S. Mortality can be reduced through early diagnosis and treatment, although clinical manifestations of PE can often be nonspecific, necessitating accurate and efficient imaging. Optimised contrast injection protocols are critical in accurately identifying acute PE. However, several factors may interfere with proper contrast delivery and scan timing (e.g., washout of contrast into the central circulation, contrast administration rate, catheter gauge flow rate limitations, technologist protocol adherence, etc.).

Studies aimed at optimising chest CTA protocols for the assessment of acute PE have focused on the timing of the contrast injection rather than on the amount of contrast, in addition to using patient weight to tailor contrast injection protocols.

The current study aimed to compare an individualised contrast protocol to the use of a standard protocol and to identify factors that influence the clinical utility, contrast usage, and limitations in process consistency when performing chest CTA for the evaluation of acute PE. Lisa Laurent, MD, MBA, CPE, of the Department of Radiology, Advocate Lutheran General Hospital, Park Ridge, IL, and colleagues performed a retrospective chart review on patients undergoing CTA with standard contrast protocol (n=50) or individualised protocol (n=50). CT images were assessed for vascular enhancement and image quality.

Demographics were comparable, however, more patients in the individualised group were admitted to intensive care unit (48% vs. 16%, $P=0.004$). Vascular enhancement and image quality were also comparable, although the individualised protocol had significantly fewer contrast and motion artefact limitations (28% vs. 48%, $P=0.039$). The researchers observed a 15 percent decrease in intravenous contrast volume in the individualised group, with no compromise in image quality.

"The results of this study, although not conclusive, are nevertheless promising. Potential variability in study parameters and patient acuity levels inherent to the utilisation of retrospective design limit standardisation and therefore the ability to collect complete information on study patients," the authors write. "Our findings would support the advantage in using individualised protocols in the CTA evaluation for acute PE phenomenon when all other scan technique variables are kept constant and a large bore needle is used."

The team says further research is needed to quantify the combined positive effects of individualised contrast administration and larger gauge catheters (and therefore higher flow rates), under specific conditions of multidetector CTA in the evaluation of acute PE from both a clinical and cost effectiveness perspective.

Source: [Medicine](#)

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