Name(s)	Project Number
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Project Title

Determining Stroke Core using CT Perfusion: a Faster, More Cost-Effective Modality than MRI

Abstract

Objectives/Goals
Diffusion-weighted magnetic resonance imaging (DWI MRI) is the current imaging modality of choice in the acute evaluation of ischemic stroke. Computed tomography perfusion (CT perfusion) is a newer modality that is cheaper and more readily available in the emergency room. This study compared CT perfusion to DWI in the evaluation of the stroke core in 30 patients with ischemic stroke.

Methods/Materials
CT perfusion and DWI scans were co-registered. CT perfusion maps were made using four different thresholds: one absolute threshold and three relative thresholds. The stroke core volume on both the CT perfusion maps and DWI images were calculated.

Results
It was found that the volume of the infarction core measured by CT perfusion correlated well with that measured by DWI. Moreover, relative cerebral blood volume (CBV) maps had a stronger correlation than absolute CBV maps.

Conclusions/Discussion
Previously, an absolute CBV threshold of 2.0 cc/100 g, rather than relative CBV thresholds, was asserted as the optimal threshold for calculating the volume of the infarction core. However, this study showed that relative CBV thresholds are more accurate in determining stroke core in a heterogeneous population. The correlation between CT perfusion and DWI suggests that CT perfusion, with its wider availability, can complement or even replace DWI in the diagnosis of acute stroke, allowing timely therapeutic intervention. Furthermore, these findings have led to the use of CT perfusion maps in ongoing trials of stroke diagnosis and treatment.

Summary Statement

CT perfusion maps correlate with the accepted standard of MRI in calculating the volume of the stroke core, and, therefore, should be implemented in the clinical setting.

Help Received

I learned the methodology at Massachusetts General Hospital.