



SPOTRIAS Project 2

IMPACT -Infarct Modeling through Perfusion Assessment by CT

Overview

An ischemic stroke occurs when an artery in the brain is blocked by a blood clot. By the time the patient is evaluated, some of the tissue fed by the blocked vessel is dead, while other tissue is damaged but has the potential to recover if blood flow is restored. Medications which can restore the flow by dissolving the clot carry a risk of causing hemorrhage, and are currently used only in a very small percentage of stroke patients. In order to decide whether the risks involved in dissolving the clot are justified, a physician must be able to predict what tissue is irreversibly damaged, how much brain tissue could be saved by restoring flow, and what that would mean for the patient's ability to function.

Purpose

The purpose of this work is to develop an accurate way to make this prediction using CT scanning, a technology that is widely available in hospitals throughout the country. We also enroll patients who undergo MR scan to compare the results with CT images.

Enrollment

A total of 500 individuals with acute ischemic stroke will be enrolled at the Massachusetts General and Brigham and Women's Hospitals in Boston.

Procedures

In patients who have suffered acute ischemic stroke, a CT scan evaluation of the blood flow to the brain (a study called "CT perfusion") will be performed at the time of initial evaluation. Further imaging will be used to show where blood flow has been restored at 24 hours after the event, and to see where brain tissue eventually recovers and where it dies. These results will be compared to the patients' long-term clinical status. This will help decide exactly how CT perfusion can best be used to evaluate the brain after a stroke, and turn CT perfusion into a more precise and useful decision-making tool for physicians who treat stroke patients. In addition, we will extend our experiment with CT perfusion model to develop a model based on DWI/MRP studies.

Example

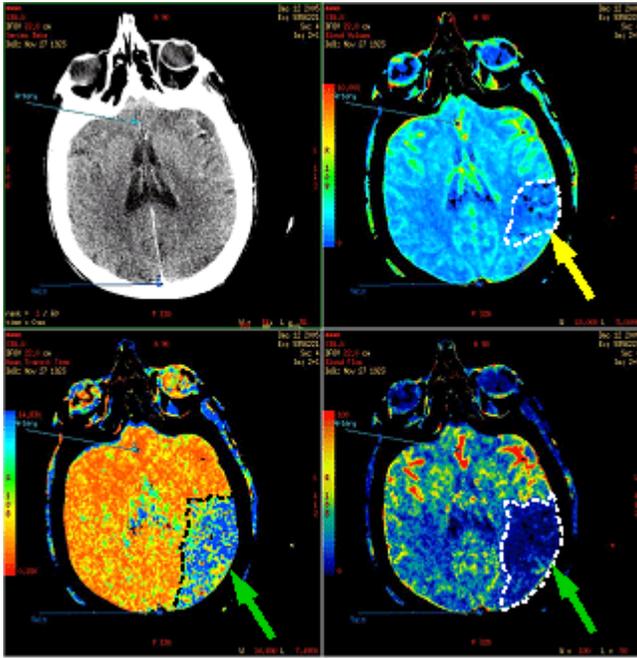
These are images from a CT perfusion study. There is an area of decreased cerebral blood volume (yellow arrow), which represents tissue that is irreversibly damaged. There is a larger area of decreased cerebral blood flow and increased mean transit time (green arrows), which represents tissue that is oxygen

deficient, but not yet irreversibly damaged. The mismatch between these areas represents tissue which may be saved by re-establishing flow through the blocked vessel, and is thus a potential target for therapy.

Inclusion & Exclusion Criteria

Inclusion Criteria

1. Age > 18 years
2. Acute symptomatic supratentorial infarct
3. CTP or MRP performed at admission (within 9 hours of symptom onset)



Exclusion Criteria

Pre-existing chronic renal disease
 History of allergic reaction or other contraindication to contrast dye
 Clinical signs of congestive heart failure on examination or CXR
 Positive pregnancy test (pre-menopausal women only)
 Unstable angina, enzyme or EKG evidence of cardiac ischemia*
 Subject has proven alternate etiology for stroke-like symptom (e.g. ICH, SAH, subdural hematoma, meningitis, seizure, multiple sclerosis, tumor)
 Acute symptomatic infratentorial ischemia

* applies only to those patients who would receive a CTA/CTP for study-specific research purposes

References

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