The Canadian Radiological Foundation

Fondation radiologique canadienne

24 hour Infarct Volume on Non-contrast CT as a Predictor of Functional Outcome at 90 days

Objectives

Stroke is the leading cause of disability in the developed world.(1) With a significant number of survivors left with severe disability, reliable early stroke prognostication has important implications for goals of care planning, treatment guidance, and disposition planning. (2, 3) Although many clinical prognostic tools such as the Barthel Index, Allen's Prognostic Score, and Canadian Neurological Score have been proposed, no objective tool has been validated to be better than physicians' informal prediction. (4-6) The use of NCCT infarct-volumetric analysis is the standard of assessment for therapeutic efficacy in animal stroke models due to its high inter-rater reliability and has been suggested to be an appropriate surrogate outcome measure for humans.(7)

Our objective is to determine the strength of correlation between brain infarct volumes on NCCT with long term patient functional outcomes, with the goal of providing clinicians valuable prognostication information.

Hypothesis

Early NCCT findings in acute ischemic stroke such as infarct and hemorrhage volumes as well as location of brain involved may predict long term patient functional outcomes.

Approach

ALIAS 2 was a multicenter, randomized, double-blind, placebo-controlled, phase 3 trial conducted between Feb 27, 2009 and Sept 10 2012 at 89 sites worldwide with 848 patients. In this study, all available 24hr follow-up NCCTs from the ALIAS part 2 trial will be collected. The digital imaging and communication in medicine (DICOM) source images will be then exported to Quantamo 1.0, a region of interest (ROI) volumetric calculator. The locations of acute infarcts and hemorrhage will be documented by 4 image interpreters blinded to patient demographics and outcomes. Patient functional outcomes measured using the modified Rankin Scale from the ALIAS trial will be used to correlate with imaging findings.

Research Plan

The project plan is to take 6-9 months for data collection, between 3-6 months for subsequent data analysis, and 3-6 months for the manuscript writing. The aim would be to submit to the results to the CAR Journal or an equivalent peer reviewed scientific journal.

The project will be supervised by Dr. Mayank Goyal and Dr. Michael Hill of the Calgary Stroke Program.

Role of the Applicant:

The applicant will:

- Collect and organize study data (DICOM and anonymized patient data from the ALIAS trial),
- Organize image interpreters for viewing sessions,
- Performing data analysis,
- Document research findings and writing final manuscript for submission.

References:

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