



SPOTRIAS Project 3

The Role of Oxidative Stress and Matrix Metalloproteinases in Ischemic Stroke

Overview

Oxidative stress is a condition of increased oxidant production in animal cells characterized by the release of free radicals and resulting in cellular degeneration. Also is an important factor in the activation of some enzymes (matrix metalloproteinases), which disrupt the blood brain barrier (membrane that controls the passage of substances from the blood into the central nervous system) and contribute to edema and hemorrhage after acute infarction. Currently, there is very limited data available on oxidative stress after stroke in humans, and no studies have examined the interaction between oxidative stress and these enzymes. Levels of oxidative stress markers and matrix metalloproteinases may help predict stroke outcome and, more importantly, may be targets for therapeutic intervention.

Purpose

The purpose of this study is to determine whether acute measurements of peripheral markers improve prediction of ischemic stroke outcome in humans and also whether the level of these markers at the onset of stroke will be associated with hemorrhagic transformation.

Enrollment

A total of 630 individuals with acute ischemic stroke will be enrolled at the Massachusetts General and Brigham and Women's Hospitals in Boston.

Procedures

Biomarker samples will be drawn at baseline, 4 hours (if in project 1), and 48 hours. The subjects will also have information collected on their neurological status, diet, medical history, medications, and stroke subtype at specific time points in the study.

Inclusion & Exclusion Criteria

Inclusion Criteria

1. Age >18 years
2. Stroke symptoms documented to be present < 9 hours
3. NIHSS score > 1

Exclusion Criteria

1. Stroke believed due to vasculitis, endocarditis, venous infarction, or primary hemorrhagic stroke
2. Absence of baseline CT or MRI
3. Other intracerebral pathology (i.e. subarachnoid hemorrhage, brain tumor, diffuse cerebral edema) on baseline imaging
4. Isolated transient monocular blindness
5. Rapidly resolving neurological deficits
6. Temp > 101 degrees F or WBC > 15,000
7. End-stage renal or hepatic dysfunction
8. Diagnosis of metastatic malignancy

9. Chronic systemic inflammatory condition (e.g. systemic lupus erythematosus, rheumatoid arthritis, polymyalgia rheumatica)
10. Inability to obtain informed consent
11. Stroke, MI, or major thrombolytic event within 30 days
12. Major surgery within 30 days