Neurovascular Research Projects

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Background

We have been conducting several studies with a wide variety of topics focusing on the novel imaging modalities, diagnostic and therapeutic interventional procedures, technical improvement, procedure safety, and improving clinical outcome of patients. Our research activities include designing, patient recruitment, data collection, analyzing, and preparing scientific abstracts and papers. Our ultimate goal is to present our scientific abstracts and papers in major prestigious conference meetings such as American Society of Neuroradiology (ASNR), Radiological Society of North America (RSNA), International Society for Magnetic Resonance in Medicine (ISMRM), Society of Neurointerventional Surgery (SNIS), and publish in high impact factor journals such as American Journal of Neuroradiology (AJNR), Radiology, Magnetic Resonance in Medicine (MRM), Neurosurgery, Journal of Neurointerventional Surgery (JNIS), etc.

Research Projects:

- Illinois Stroke Intervention Registry and Trials Network (ISRTN)
- High Resolution 3T and Quantitative MRI of Intracranial Atherosclerotic Disease May Stratify Risk for Ischemic Stroke
- A Comparison of Stroke Intervention Modalities: Mechanical Thrombectomy Devices
- Anemia and Vascular Malformation of Central Nervous System Research Registry
- Development of MRI-based Cerebral Oxygen Extraction Fraction
- Hemodynamic Analysis of Intracranial Aneurysms and Arteriovenous Malformation Using 4D flow MRI
- Systematic Review of Imaging Based Selections for Basilar Artery Thrombectomy
- DWI or CTP Assessment with Clinical Mismatch in the Triage of Wake Up and Late Presenting Strokes Undergoing Neurointervention. (DAWN Trial)

ICAD Study

High Resolution 3T and Quantitative MRI of Intracranial Atherosclerotic Disease May Stratify Risk for Ischemic Stroke. To initiate a prospective study to recruit asymptomatic and symptomatic patients with severe intracranial atherosclerotic disease (ICAD) for a longitudinal clinical, laboratory and imaging study with high resolution 3T MRI, DCE MRI and DSC MRI-PWI examinations. Asymptomatic or symptomatic patients with severe (>50%) intracranial stenosis/occlusion, of at least one segment of the supratentorial ICA, A1-A2 ACA, M1-M2 MCA, distal vertebral basilar artery, and P1-P2 PCAs are included.

DAWN Trial

Age 18 - 80
Pre-stroke NIHs 0-1
ICA and/or MCA M1/M2 occlusion.
Clinical Imaging Mismatch (CIM) subgroup per rapid MRI-DWI or CTP-CBF maps & NIHs
Day 3 (18 hrs) - 7 days (≤60 days): - mRS and NIHs ≤2, ≥72 hrs from TSW

Trevor Thrombectomy* + Medical Management
Medical Management Only

NIHs - mRS 2/4 (6/6) Hours:

Day 3 or Discharge (whichever is earlier):
- mRS by BLINDED investigator & NIHs
- NIHs 3 to 5 (10-30 days):
  - mRS by BLINDED investigator & NIHs
  - NIHs 3 to 5 (10-30 days):
  - mRS by BLINDED investigator & NIHs

Quantified Hemodynamic Evaluation of Intracranial Vascular Malformation Using 4D flow MRI

Arteriovenous malformations and aneurysms are important etiologies of hemorrhagic stroke. However, current imaging modalities and risk do not provide insights into individual AV hemodynamics and its role in pathophysiology. 4D flow MRI is an emerging novel technique that provides exclusive possibilities for non-invasive hemodynamic evaluation of different types of intracranial pathologies.

Normal: Control

In-vivo Assessment of the Impact of Endovascular Embolization on 3D Intracranial Hemodynamics in Pediatric Patients with Vein of Galen Aneurysmal Malformations.

Basilar Artery Thrombectomy

A systematic review of studies focused on the role of imaging in patient selection and final clinical outcome of patients suffering form basilar artery stroke.