Carotid **R**evascularization **E**ndarterectomy vs **S**tenting **T**rial – **H**emodynamics (**CREST-H**)




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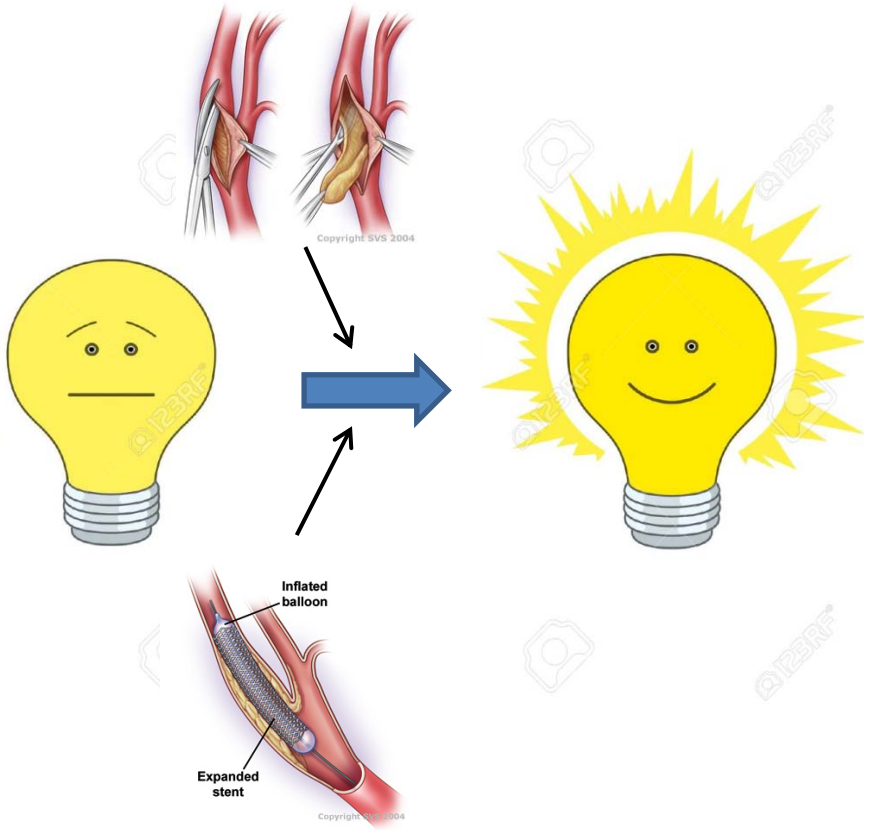
WHAT IS THE STUDY?

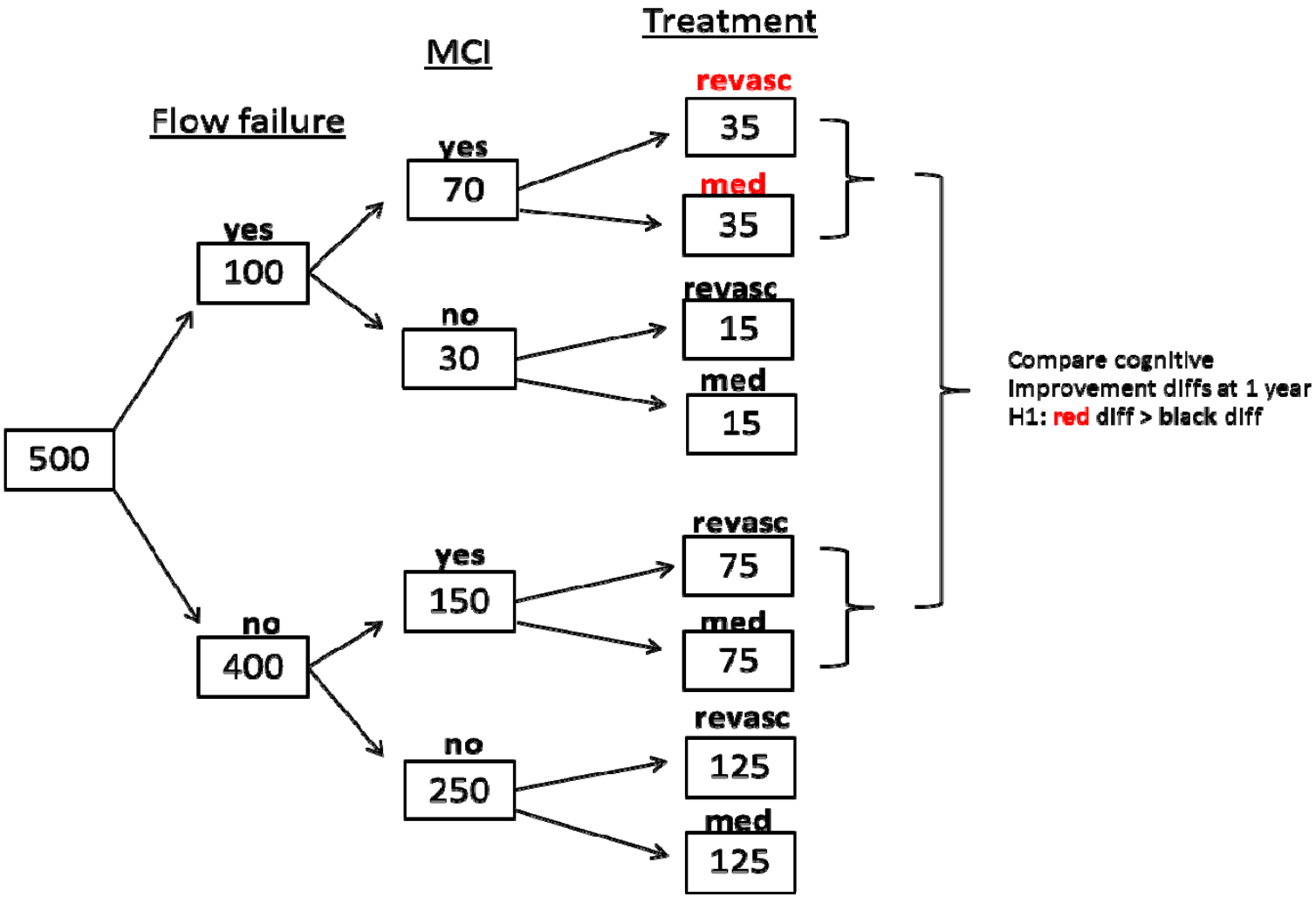
- Background: There is evidence that patients with high grade carotid stenosis may have cognitive impairment if they have low cerebral blood flow on the side of carotid occlusion.
- Overall plan: CREST-H will assess cognitive outcomes in a subset of CREST-2 patients with cerebral hypoperfusion and cognitive impairment, comparing those who get revascularized (CEA or CAS) versus those who get Intensive Medical Management alone. CREST-2 patients without hypoperfusion will serve as controls.

CREST- H Study Question

- Can revascularization (CEA or CAS) improve cognitive impairment among a subset of CREST-2 patients with cerebral hemodynamic impairment?



Study Design



WHAT WE NEED:

- To participate as a CREST-H site you must have:
  - 1.5T or 3T MRI scanner (3T preferred)
  - The capability to do gado-based MR perfusion on your CREST-2 patients before they get their procedure or within a week of enrollment if randomized to medical therapy alone. Other standard MRI images will also be obtained.
  - A designated, independent co-investigator who can upload de-identified images to the CREST-2 imaging site at U Maryland.

WHAT YOU GET:

- $1,125 start-up to cover regulatory/IRB costs, and up to $1,725 per patient to cover imaging and CRF completion.
- This is in addition to CREST-2 reimbursements.

WHAT WE HOPE TO HAVE AT THE END OF THE STUDY:

1. An alternative indication for CEA/CAS in patients with high grade stenosis and flow impairment (**cognitive improvement)**, even if CREST-2 shows no difference in stroke outcomes

2. Baseline and 1-yr imaging information:
   - silent infarction (DWI/ADC , FLAIR)
   - WMH (FLAIR)
   - microbleeds (GRE)
   - cortical thickness (Hi-res T1)
   - collaterals (CE-MRA)

Procedures

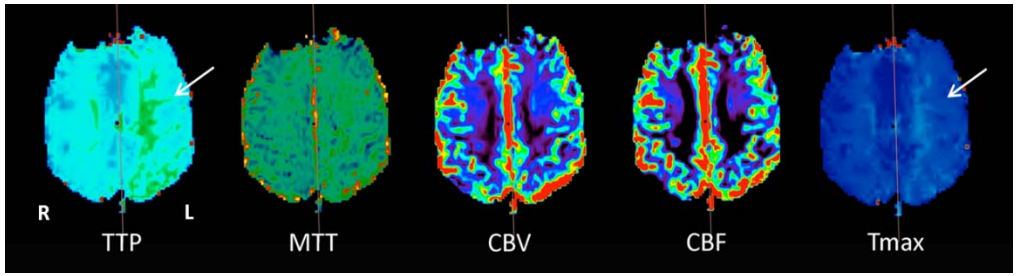
- Cognitive battery (all CREST-2 pts)

Table 3. CREST-2/H Cognitive Assessment

Domain	Test	Behavior Outcome	CREST-2 Composite	CREST-H Composite
Learning	CERAD Word List Learning	Sum of 3 trials	x	
Attention	Digit Span	Number of sequences correctly repeated (forward + backward)	x	
Memory	CERAD Delayed Recall	Number Correct	x	**x**
Executive Function	Animal Fluency	Number correct in 1 min	x	**x**
	Letter Fluency (Controlled Oral Word Association)	Number correct in 1 min for each of F, A and S.	x	**x**
	Oral Trail Making A & B	Time to complete Part B		**x**

- MRI: DWI/ADC, FLAIR, MRP, GRE, Hi-res T1, CE-MRA

Perfusion scans:



CREST-H Protocol

- CREST-2 pts enrolled into CREST-H (after CREST-2 enrollment)
- Baseline MRI/MRP obtained, anonymized, and uploaded to U Maryland image processing site (unblinded data kept separate from treating MDs)
- Imaging data sent
  - to UCLA for MRP processing
  - to Mayo Rochester for structural image analysis
- 1 year follow up MRI/MRP scheduled for patients with TTP>2sec
- All CREST-2 patients obtain enhanced cognitive exams at baseline and follow up at years 1-4

HOW THIS STUDY WILL SUCCEED

- Recruitment
- Recruitment
- Recruitment

Thank you!