UAMS EM JC summary - August 2018
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Thrombectomy for Acute Stroke

Clinical Bottom Line
Endovascular thrombectomy within 24 hours is safe and leads to better functional outcomes in patients with acute ICA/proximal MCA ischemic stroke.

PICO
P: Adult ED patients with ICA/proximal MCA ischemic CVA
I: Thrombectomy within 24 hours of LKWT
C: standard medical therapy
O: improved disability at 90 days on the Modified Rankin Scale

Background
Acute Ischemic Stroke is a leading cause of long-term disability. 1 out of every 20 deaths each year is caused by stroke. The estimated economic impact of stroke in the U.S. is around $34 billion/year. 2013 AHA/ASA guidelines recommend IV tPA for Acute ischemic stroke within 3-4.5 hours from LKWT. Subsequent trials showed a benefit to early (less than 6 hours from LKWT) IA fibrinolysis/thrombectomy in select patients. In patients with large neurologic deficits which would correspond to massive anterior circulation ischemic stroke, it was hypothesized that thrombectomy within 16-24 hours could improve functional outcomes. This was based on CT perfusion scanning, which can show a mismatch between core infarct size and distribution of neurologic deficit. These trials sought to use clinical criteria combined with perfusion scanning and CT/MR angiography to determine candidates who would likely benefit from thrombectomy and determine whether functional outcomes could be improved.

Trial 1

Nogueira RG, Jadhav AP, Haussen DC, Bonafe A, Budzik RF, Bhuva P, et al..
Thrombectomy 6 to 24 hours after stroke with a mismatch between deficit and infarct.
N Engl J Med. 018 Jan 4;378(1):11-21.
https://www.nejm.org/doi/full/10.1056/nejmoa1706442

Validity Rating: low to moderate risk of bias

The Basics
Prospective RCT of 206 patients with acute ischemic CVA of a large vessel (intracranial internal carotid artery or proximal middle cerebral artery) on CTA or MRA with a last known well time of 6-24 hours earlier with a disproportionately severe clinical deficit relative to infarct volume were randomized into either thrombectomy or given the standard medical treatment.

Exclusion Criteria:

- Infarct volume > 51 ml or involving > 1/3 of the MCA territory on CT or at baseline
- Pre-stroke score >1 on the modified ranking scale
- Intracranial hemorrhage on CT or MRI
- Occlusion was resolved after giving alteplase

Primary Outcome:

- Utility weighted modified ranking scale at 90 days
- Functional independence at 90 days

Secondary Outcome:

- Early therapeutic response as defined by a decrease in the NIHSS scale of >10 from baseline or NIHSS of 0 or 1 on day 5, 6, 7, or at discharge (if that occurred before day 5)
- Death from any cause at 90 days
- Centrally adjusted infarct volume and change from baseline in the infarct volume at 24 hours
- Evidence of recanalization of the occluded vessel on CTA or MRA at 24 hours

Follow up:

- Primary done by certified assessors, but 43 patient assessments had to be done over the phone with the patient and/or the caregiver

Results:

- Improved 90 day disability in thrombectomy group
- 49% had functional independence in thrombectomy vs 13% in control group.
- NNT to prevent 1 person from being disabled was 2.8
- ARR was 36%
- Safe – there was no difference between the rates of death and intracranial hemorrhage

Limitations/Biases:

- The study was funded by the pharmaceutical company who supplied the thrombectomy equipment and also provided stipends to the authors
- The data was not presented in the traditional, most commonly accepted format for scientific research which makes it difficult to analyze and decipher its results and applicability, especially for the standard provider.

Trial 2

Albers GW, Marks MP, Kemp S, Christensen S et al. Thrombectomy for stroke at 6 to 16 hours with selection by perfusion imaging. *N Engl J Med*. 018 Feb 22;378(8):708–718. https://www.ncbi.nlm.nih.gov/pubmed/29364767

Validity Rating: low to moderate risk of bias

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The Basics
Prospective Randomized, open-label, controlled trial with blinded outcome assessment of 182 patients with acute ischemic stroke. Patients were randomized to either endovascular therapy + standard medical therapy or standard medical therapy alone. 92 patients were placed in the intervention group, 90 in the control. 2 patients randomized to intervention had procedure initiated, but not completed. These were still analyzed with their treatment group.

Inclusion Criteria
- 6-16 hours from LKWT
- Initial infarct volume <70mL
- Ischemic volume:infarct volume ratio > or = 1.8
- Penumbra 15mL or greater
- Involvement of cervical ICA or proximal MCA on CTA/MRA

Primary Efficacy Outcome
- Ordinal score on modified Rankin scale at 90 days

Secondary Efficacy Outcome
- Functional independence (mRS 0-2) at 90 days

Primary Safety Outcome
- Death within 90 days
- Occurrence of symptomatic intracranial hemorrhage within 36 hours (increase in NIHSS of at least 4 points)

(There were also some imaging and technical endovascular outcomes measured, which we will not get into.)

Follow up
3 patients were lost to follow up

Results
- The intervention group (endovascular + standard medical therapy) showed a more favorable distribution of disability scores on the mRS at 90 days; adjusted odds ratio was 3.36(CI 1.96-5.77)
- Functional independence at 90 days was 45% in the intervention group and 17% in the standard medical therapy group; relative risk of 2.67, absolute risk reduction of 28%, relative risk reduction of 0.72
- Safety outcomes showed no statistically significant differences between groups
- NNT in this trial was 3.5

Limitations/Biases
- Trial was stopped early due to benefit
- This limited the power to analyze subgroups
- Table 1 could have included baseline health characteristics, vital signs, etc.