

Clinical outcome prediction after thrombectomy of proximal middle cerebral artery occlusions by the appearance of lenticulostriate arteries on magnetic resonance angiography: A retrospective analysis.

Running headline: Lenticulostriate artery dilatation after Stroke

Online Supplement

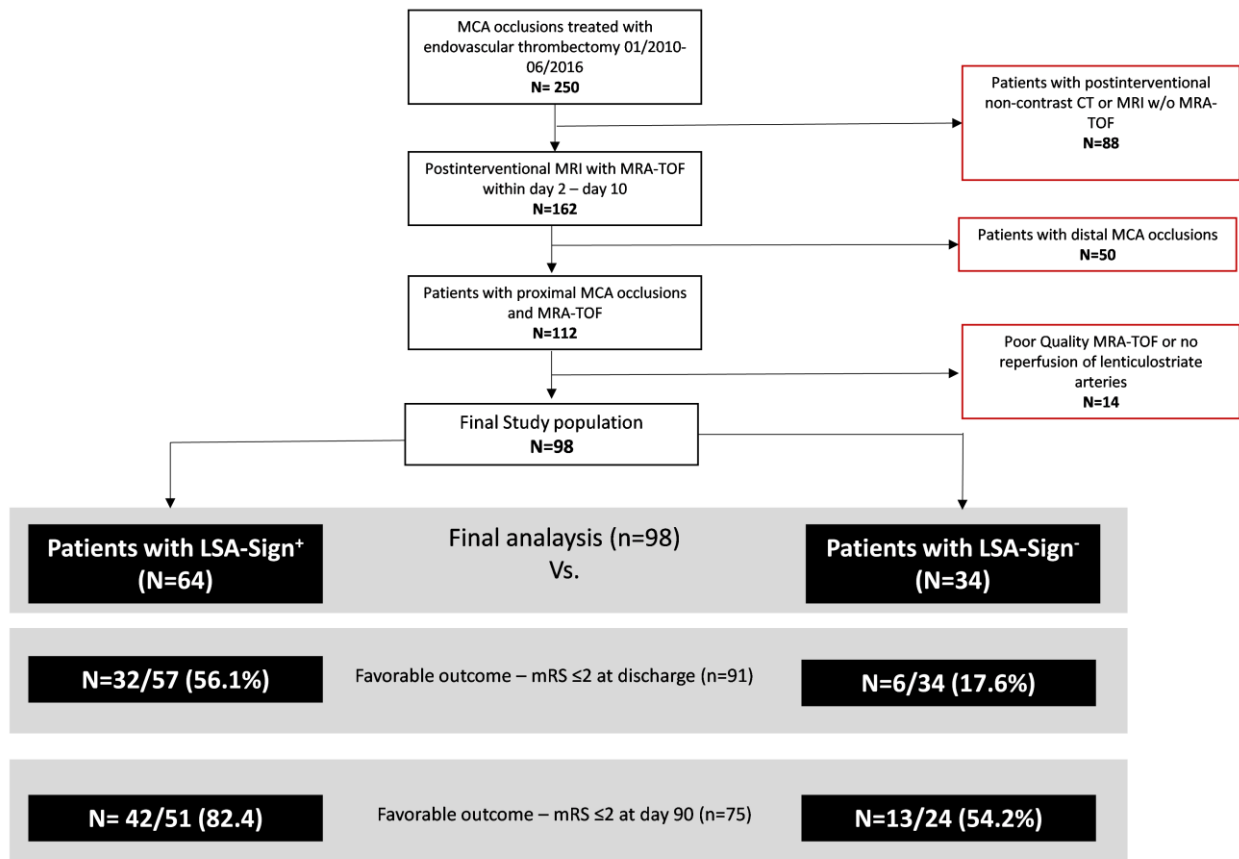
Supplementary dataset I – Grading and MRA-TOF images

Supplementary data I is supported in the .zip format and consists of the following files:

- Grading.xlsx providing all gradings from different readers and the respective consensus read
- the folder ‘MRA-TOF’ provides all MRA-TOF maximum intensity projection images of the respective patient. Grading and respective images are identifiable using the Study ID and folder number.

Supplementary figure I – Study flow-chart

MCA, middle cerebral artery; w/o, without; MRA-TOF, time-of-flight magnetic resonance angiography



Supplementary Table I – MRA-TOF sequence details

| | |
|---------------------|---------------------|
| Sequence name | 3D TOF-MRA |
| TR/TE (ms) | 25000/3454 |
| Slice thickness | 1.2mm |
| Flip angle | 20 |
| In plane resolution | 0.403 x 0.7 x 0.6mm |

Supplementary Table II - Intraclass correlation coefficients

| Inter-Rater | ICC | 95%-CI |
|--|------------|---------------|
| Left LSA grade | 0.928 | 0.805-0.907 |
| Right LSA grade | 0.941 | 0.913-0.961 |
| Difference LSA grade | 0.856 | 0.785-0.903 |
| Intra-Rater | | |
| Left LSA grade | 0.886 | 0.830-0.924 |
| Right LSA grade | 0.934 | 0.821-0.916 |
| Difference LSA grade | 0.885 | 0.828-0.923 |
| LSA, lenticulostriate artery; ICC intraclass correlation coefficient (cf. methods) | | |

Supplementary Table III – Results of LSA gradings

| | Rater 1 (n=98) | Rater 1 – Session 2 (n=98) | Rater 2 (n=98) |
|--|----------------|-------------------------------|----------------|
| LSA ischemic hemisphere | | | |
| • 0 | • 18 | • 16 | • 17 |
| • 1 | • 22 | • 24 | • 29 |
| • 2 | • 41 | • 30 | • 56 |
| • 3 | • 17 | • 28 | • 5 |
| • Median (IQR) | • 2 (1-2) | • 2 (1-3) | • 2 (1-2) |
| LSA grade unaffected hemisphere | | | |
| • 0 | • 45 | • 47 | • 34 |
| • 1 | • 46 | • 45 | • 56 |
| • 2 | • 7 | • 5 | • 8 |
| • 3 | • 0 | • 1 | • 0 |
| • Median (IQR) | • 1 (0-1) | • 1 (0-1) | • 1 (0-1) |
| P for comparison (Paired t-test) | <0.001* | <0.001* | <0.001* |
| LSA ischemic hemisphere > LSA unaffected hemisphere (LSA+) | 36 | 30 | 33 |
| LSA unaffected hemisphere > LSA ischemic hemisphere | 2 | 0 | 2 |
| Median difference | 1 (0-2) | 1 (0-2) | 1 (0-1) |

Supplementary Table IV – Association of LSA-Sign⁺ with clinical outcomes according to different readers

| Rating | Outcome | Adjusted Odds Ratio for LSA-Sign⁺ | 95%-CI | P value |
|---|--|---|---------------|----------------|
| <u>Reader 1</u> <u>Session 1</u> | Good neurologic outcome | 9.120 | 2.455-33.872 | 0.001** |
| | Substantial neurologic improvement | 3.564 | 1.174-10.817 | 0.025* |
| | Good functional short-term outcome (mRS ≤2 at discharge) | 6.615 | 1.762-24.835 | 0.005** |
| | Good functional mid-term outcome (mRS ≤2 at day 90) | 3.518 | 0.954-12.966 | 0.059 |
| <u>Reader 1</u> <u>Session 2</u> | Good neurologic outcome | 11.574 | 2.927-45.773 | <0.001** |
| | Substantial neurologic improvement | 7.556 | 2.268-25.180 | 0.001** |
| | Good functional short-term outcome (mRS ≤2 at discharge) | 9.046 | 2.217-36.906 | 0.002** |
| | Good functional mid-term outcome (mRS ≤2 at day 90) | 5.748 | 1.474-22.411 | 0.012* |
| <u>Reader 2</u> | Good neurologic outcome | 6.742 | 1.896-23.972 | 0.003** |
| | Substantial neurologic improvement | 3.877 | 1.296-11.599 | 0.015* |
| | Good functional short-term outcome (mRS ≤2 at discharge) | 8.471 | 2.095-34.244 | 0.003** |
| | Good functional mid-term outcome (mRS ≤2 at day 90) | 4.653 | 1.178-18.373 | 0.028* |
| LSA, lenticulostriate arteries; CI, confidence interval; *, p<0.05; **, p<0.01; § Odds ratio for LSA-sign ⁺ for each rater. Odds Ratios were adjusted for age, admission NIHSS, reperfusion grade, time to treatment and final infarct volume. | | | | |

Supplementary Table V – Grade difference between affected and unaffected hemisphere and association with clinical outcomes

| Outcome | Adjusted Odds Ratio for every LSA grading difference increase[§] | 95%-CI | P value |
|--|--|---------------|----------------|
| Good neurologic outcome | 4.827 | 1.975-11.798 | 0.001** |
| Substantial neurologic improvement | 2.808 | 1.265-6.233 | 0.011* |
| Good functional short-term outcome (mRS \leq 2 at discharge) | 2.641 | 1.197-5.827 | 0.016* |
| Good functional mid-term outcome (mRS \leq 2 at day 90) | 2.691 | 1.043-6.944 | 0.041* |

LSA, lenticulostriate arteries; CI, confidence interval; *, p<0.05; **, p<0.01; § LSA grading difference refers to difference between LSA appearance on the affected and unaffected hemisphere. Odds Ratios were adjusted for age, admission NIHSS, reperfusion grade, time to treatment and final infarct volume.

Supplementary Table VI – General visibility of LSA and association with clinical outcomes

| Outcome | Adjusted Odds Ratio for every grade increase of unaffected LSA[§] | 95%-CI | P value |
|--|---|---------------|----------------|
| Good neurologic outcome | 0.885 | 0.392-1.999 | 0.769 |
| Substantial neurologic improvement | 1.185 | 0.546-2.573 | 0.667 |
| Good functional short-term outcome (mRS \leq 2 at discharge) | 1.310 | 0.537-3.195 | 0.552 |
| Good functional mid-term outcome (mRS \leq 2 at day 90) | 1.669 | 0.582-4.787 | 0.341 |

LSA, lenticulostriate arteries; CI, confidence interval; *, p<0.05; **, p<0.01; § LSA grading (0-3) on the unaffected hemispheres reflects general visibility of the MCA perforators. Odds Ratios were adjusted for age, admission NIHSS, reperfusion grade, time to treatment and final infarct volume.

Supplementary Table VII – Test characteristics for LSA-Sign⁺ with regards to different outcomes

| Outcome | Prevalence | Sensitivity | Specificity | PPV | NPV |
|---|-----------------------|------------------------|------------------------|------------------------|------------------------|
| Good neurologic outcome | 42.8% (33.0-53.2%) | 85.7% (70.8%-94.1%) | 50.0% (36.5%-63.5%) | 56.3% (43.3%-68.4%) | 82.4% (64.8%-92.6%) |
| Substantial neurologic improvement | 59.2% (48.8%-68.9%) | 75.9% (62.5%-85.7%) | 50.0% (34.1%-65.9%) | 68.8% (55.8%-79.4%) | 58.8% (40.8%-74.9%) |
| Good functional short-term outcome (mRS ≤ 2 at discharge) n=91/98 | 41.8% (31.6-52.6) | 84.2% (68.1%-93.4%) | 52.8% (38.8%-66.5%) | 56.1% (42.4%-69.0%) | 82.4% (64.8%-92.6%) |
| Good functional mid-term outcome (mRS ≤ 2 at day 90) n=75/98 | 73.3% (61.7%-82.6%) | 76.4% (62.7%-86.3%) | 55.0% (32.0%-76.2%) | 82.4% (68.6%-91.1%) | 45.8% (26.2%-66.8%) |