

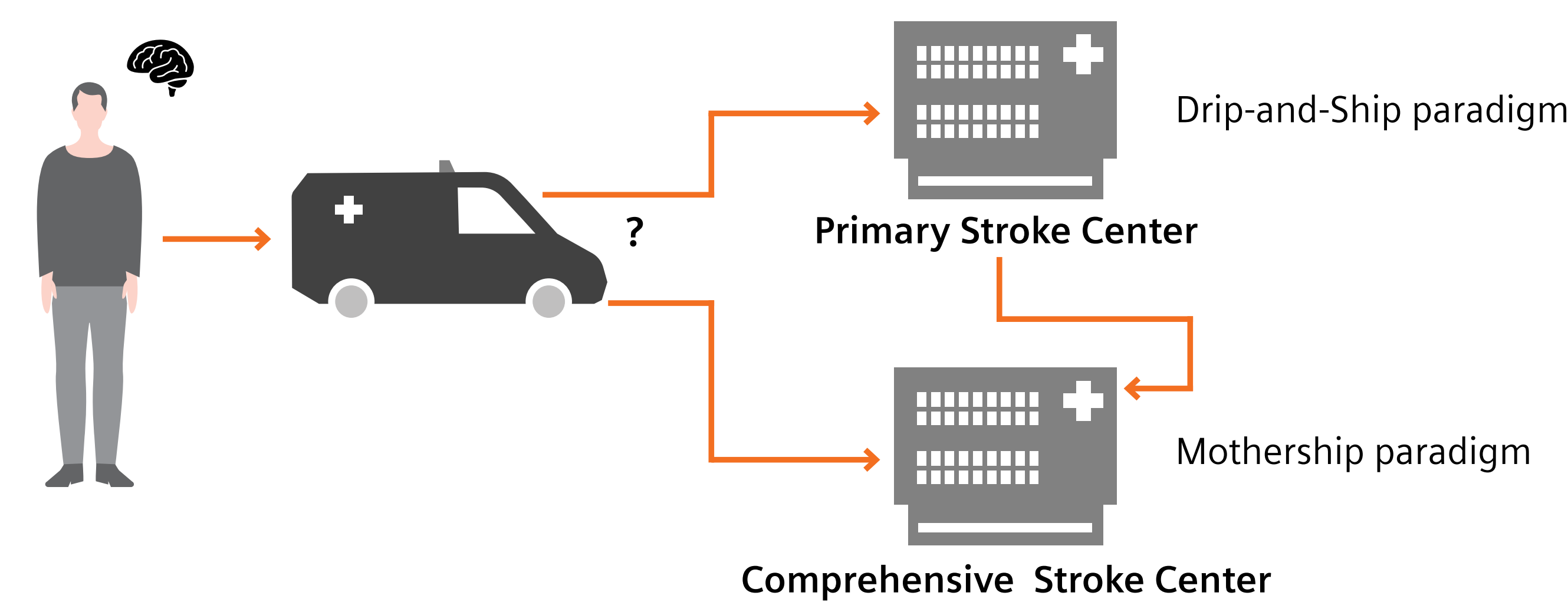
Impact of the Interhospital Transfer Time on the Clinical Outcomes of Acute Stroke Patients Treated with Mechanical Thrombectomy

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Objectives:

In ischemic stroke care, fast reperfusion is essential for disability free survival. Mechanical thrombectomy (MT) is recommended for treatment of acute ischemic stroke (AIS) in patients with large vessel occlusion (LVO). Given the expertise required for MT, it is available only at the comprehensive stroke centers (CSC). It is unknown if bypassing primary stroke centers (PSC) in favor of MT (mothership) outweighs transport to the nearest PSC for alteplase and then transfer to CSC for MT (drip-and-ship) for LVO patients.



Methods:

We retrospectively analyzed 176 consecutive LVO patients (76 in the mothership group and 100 in the drip-and-ship group). We evaluated mRS (modified Rankin Score) at discharge and thrombolysis in cerebral infarction (TICI) score.

Study population: This is a retrospective observational cohort study using North Shore University Hospital's stroke database to assess the clinical and imaging outcomes of AIS patients following MT. We selected consecutive AIS patients with MT who presented to the CSC (North Shore University Hospital) Patients were categorized into two comparison groups: (1) Mothership (MS) – AIS patients who arrived directly to the CSC, and (2) Drip-and-Ship (DS) – AIS patients who were transferred from a PSC to the CSC for MT treatment.



Stroke Database: For this analysis we used SHOUT (Stroke Health Outcomes) database. This database contains the information on all stroke patients presenting to our CSC at Northwell Health from November 1, 2011 till October 1, 2018.

Predictors and Outcome Variables: The primary outcome was the clinical functional status assessed by the mRS at discharge. Out of 176 patients, only 5 patients had missing mRS at discharge. Of them 4 were missing mRS at discharge in MS group, and 1 in DS group. A favorable outcome was considered an mRS of 0 to 2, which represents patients with functional independence. The secondary outcome was the recanalization success after MT defined on DSA using the TICI score. A favorable outcome was considered substantial or complete recanalization represented as TICI 2b-3. We also studied mortality as a tertiary outcome as in-hospital and 7-day mortality rates.

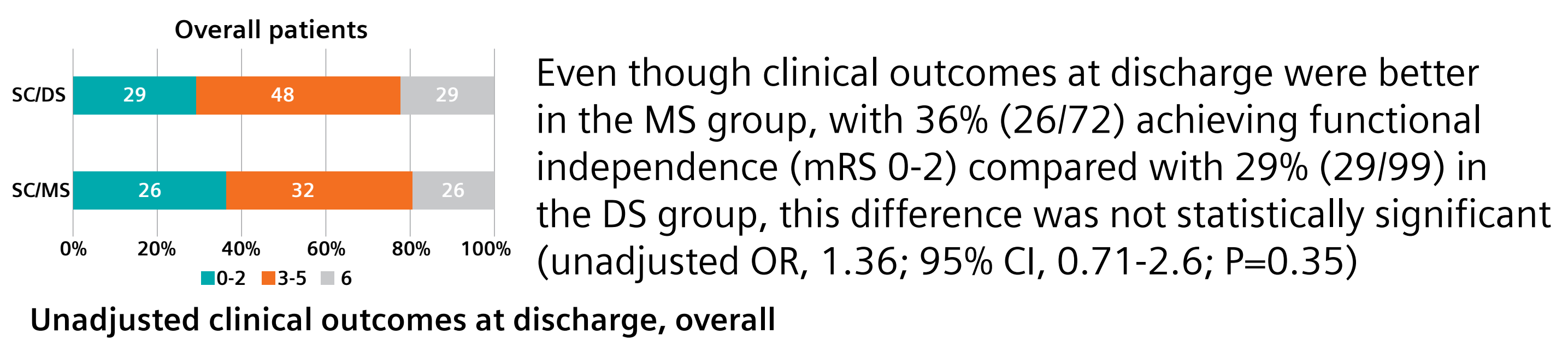
Statistical Analysis: For between-group comparisons the following tests were used: t-tests for continuous variables, and χ^2 tests for categorical variables. Statistical significance was considered for p-values < 0.05. The primary outcome variable – mRS at 0-2 at discharge was modeled against predictors of interest using logistic regression adjusted for age, transfer status (MS vs DS), transport time directly to CSC, and diabetes.

Results:

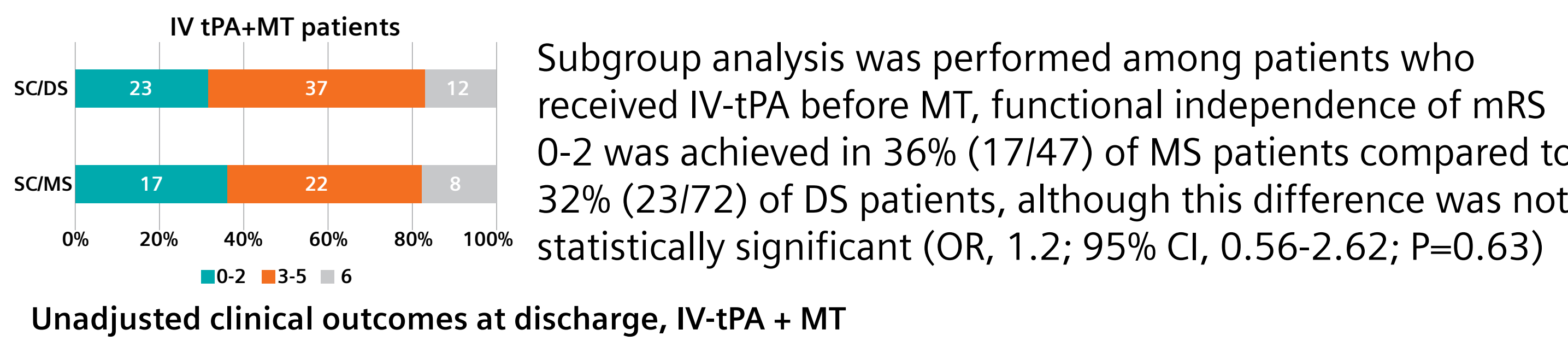
There was no statistically significant difference between the MS and DS groups in the univariate analysis for the primary outcome of favorable functional status (mRS 0-2). The secondary outcome, assessed by successful recanalization (TICI 2B-3) rates, were not significantly different in the MS and DS groups. Mortality (in-hospital and 7-day) were also similar between the comparison groups.

Outcomes	Mothership (n=72)	Drip-and-Ship (n=99)	P Value
mRS≤2 at discharge	26 (36%)	29 (29%)	0.346
Recanalization (TICI 2B-3)	54 (75%)	76 (77%)	0.831
In-hospital mortality	10 (14%)	17 (17%)	0.484
7-day mortality	5 (7%)	11 (11%)	0.312

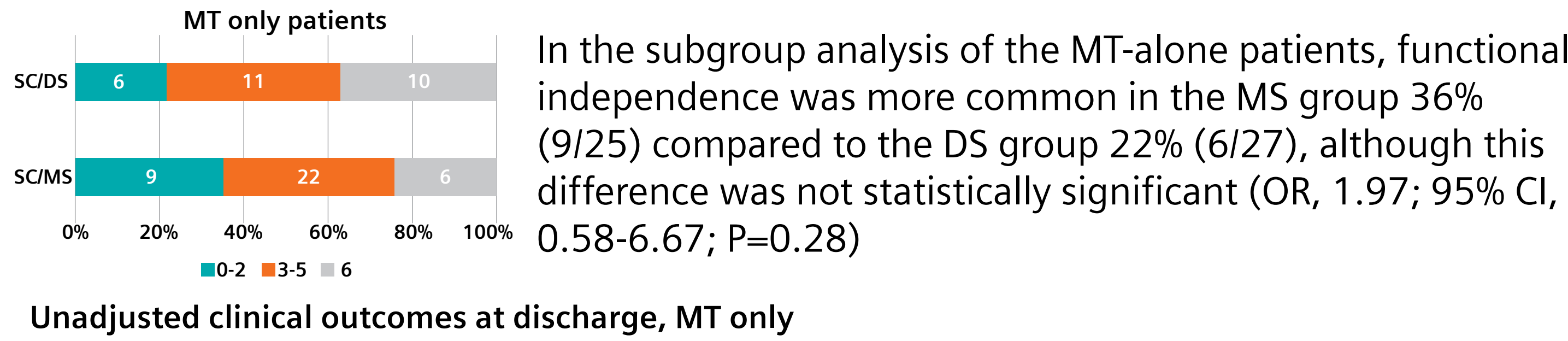
Clinical and Imaging Outcomes in Acute Stroke Patients with Mechanical Thrombectomy



Unadjusted clinical outcomes at discharge, overall



Unadjusted clinical outcomes at discharge, IV-tPA + MT



Unadjusted clinical outcomes at discharge, MT only

To determine the relative importance of the covariates on the clinical and imaging outcomes, a logistic regression model was developed. For the primary outcome of functional independence (mRS 0-2 at discharge), the following variables listed in the table below were statistically significant.

Outcome	OR (95% CI)	P Value adjusted
Age, (SD)	0.4 (0.3-0.54)	<0.001
Absence of diabetes	1.69 (1.06-2.70)	0.028
Transport time directly to the CSC less than 30 minutes	1.56 (1.02-2.38)	0.043
Mothership model	2.5 (1.72-3.66)	<0.001

Adjusted odds ratios for MS versus DS strategy

Conclusion:

Our study found that AIS patients with LVO have improved clinical outcomes in the MS strategy, when first admitted to the CSC, and the transport time directly to the CSC is less than 30 minutes. At the time of first encounter of the patient with EMS it is often not clear if the patient is a potential candidate for MT. Therefore, in order for patients located less than 30 minutes drive to a CSC to benefit from the findings of our study, EMS team should possess a reliable tool to identify MT candidates, and bring them directly to CSC, avoiding PSC altogether for these LVO patients.

References:

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