

Collateral status determines the probability of receiving endovascular treatment in ischemic stroke patients with large vessel occlusion transferred via drip & shift to a Stroke Center

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Background: Our Regional Stroke Center (RSC) provides endovascular reperfusion for a large referral area including two primary stroke centers and five stroke-ready hospitals. A regional stroke code system is being developed. In order to design the best transfer strategy, we aimed to study (1) the relationship between the transfer system to the RSC and the probability of receiving endovascular treatment (EVT) and (2) to identify variables associated with receiving EVT in the indirect transfer group (Drip & Ship, D&S).

Methods: We performed a retrospective analysis of our RSC stroke code prospective registry between 06/2015 and 12/2016. Inclusion criteria: acute ischemic stroke patients with anterior circulation large-vessel occlusion (LVO), previous modified Rankin score 0-2, and first CT scan qualifying for EVT (ASPECTS \geq 5), transferred to RSC with the intention to be evaluated for EVT. Transfer system was categorized as straight to RSC (Mothership, M), versus intermediate station in another hospital (D&S). Baseline variables and attention times were analyzed. A second CT was performed upon arrival to RSC in all D&S patients.

Results: We included 212 acute ischemic stroke LVO patients who were transferred to our RSC during the study period (mean age 72, median NIHSS 18). Of them, 115 (54%) were D&S and 96 (46%) were M. Both groups were comparable regarding age, baseline NIHSS, time to first CT and initial CT ASPECTS. On arrival to the RSC, D&S patients showed a significantly longer onset-to-RSC time (336 min vs. 194 min, $p < 0.001$) and a worse ASPECTS score ($p < 0.001$). A total of 149 (70%) patients were eligible for EVT, with a lower proportion in the D&S group (71/115, 62%) vs. M (78/96, 81%), $p = 0.002$. In the D&S group, independent predictors of EVT eligibility were: higher ASPECTS on CT performed at origin (OR 1.77 [1.3-2.5], $p = 0.001$) and a lower ASPECTS decay between referral hospital and RSC (OR 0.55 [0.38-0.8], $p = 0.002$).

Conclusions: In our stroke network, acute LVO patients transferred to RSC via D&S had a lower probability of receiving EVT than M patients. The probability of being treated with EVT in the D&S group depends on ASPECTS score at origin and on ASPECTS decay during the transfer, which are largely determined by collateral status. The role of more precise methods to assess collateral status in D&S patients needs to be studied.