Charlotte Large Artery Occlusion Endovascular Therapy Outcome Score (CLEOS)

The Charlotte Large Artery Occlusion Endovascular therapy Outcome Score, CLEOS = (5 x Age) + (10 x NIHSS) + Glucose - (150 x Cerebral Blood Volume Index). CLEOS was associated with increased odds of poor 90-day outcome (per 1-point increase, OR 1.008, 95% CI 1.006-1.010, $p < 0.0001$) and performed better than Stroke Prognostication using Age and National Institute of Health Stroke Scale - 100 (AUC 0.62, $p < 0.0001$) and Houston Intra-Arterial Therapy 2 (AUC 0.70, $p < 0.0063$), with a trend observed versus Pittsburgh Response to Endovascular therapy (AUC 0.72, $p = 0.0884$), in the combined analysis of the derivation and validation cohorts. CLEOS ≥ 700 was not associated with a lower risk of poor outcomes despite excellent endovascular reperfusion.

CLEOS can predict poor 90-day outcomes after thrombectomy and help risk stratify patients based on the degree of revascularization after EVT [1].

Karamchandani et al. retrospectively analyzed records from a health system's code stroke registry, including consecutive successful thrombectomy patients from August 2020 to February 2023 presenting with an anterior circulation large vessel occlusion who were evaluated with pre-EVT CT perfusion. Primary and secondary outcomes were 90-day modified Rankin Scale (mRS) scores of 0-2 and 0-1, respectively. Logistic regression was performed to evaluate the ability of each scale to predict the outcomes. Scales were compared by calculating the area under the curve (AUC).

A total of 465 patients (mean age 68.1 [±14.9] years, median National Institutes of Health Stroke Scale [NIHSS] 16 [11-21]) met inclusion criteria. In the logistic regression, the Charlotte Large Artery Occlusion Endovascular therapy Outcome Score (CLEOS), Totaled Health Risks in Vascular Events, Houston Intra-Arterial Therapy-2, Pittsburgh Response to Endovascular therapy, and Stroke Prognostication using Age and NIHSS were significant in predicting the primary and secondary outcomes. CLEOS was superior to all other scales in predicting 90-day mRS 0-2 (AUC .75, 95% confidence interval [CI] .70-.80) and mRS 0-1 (AUC .74, 95% CI .69-.78). Twenty of 22 patients (90.9%) with CLEOS <315 had 90-day mRS 0-2.

CLEOS predicts independent and excellent neurological function after anterior circulation EVT [2].

1)
Karamchandani RR, Prasad T, Strong D, Rhoten JB, Asimos AW. A tool to improve stroke outcome prediction: The charlotte large artery occlusion endovascular therapy outcome score. J Stroke Cerebrovasc Dis. 2022 May;31(5):106393. doi: 10.1016/j.jstrokecerebrovasdis.2022.106393. Epub 2022 Mar 8. PMID: 35276475.
2)
Karamchandani RR, Satyanarayana S, Yang H, Strong D, Rhoten JB, Clemente JD, Defilipp G, Patel NM, Bernard JD, Stetler WR, Parish JM, Guzik AK, Wolfe SQ, Helms AM, Macko L, Williams L, Retelski J, Asimos AW. The Charlotte Large artery occlusion Endovascular therapy Outcome Score predicts independent outcome after thrombectomy. J Neuroimaging. 2023 Sep 4. doi: 10.1111/jon.13151. Epub ahead of print. PMID: 37664972.