

Abstract

CT perfusion (CTP) is applied to assess brain tissue viability in patients with acute ischemic stroke. CTP results are one of the most significant indication criteria for mechanical thrombectomy (MT) in case of large vessel occlusion in the late time window > 6 hours or in wake-up strokes. However, CTP is not the modality of choice to determine candidates suitable for MT in the early time window < 6 hours, as the benefits of CTP are questionable in this time setting. We studied cohort of patients after technically successful MT performed regardless of CTP results with follow-up imaging 24 ± 2 hours after MT.

In the first part of the study, we evaluated the accuracy of 3 types of NeuroPerfusion Suite syngo.via SW parameter settings for CTP aiming to determine the most accurate one in predicting the final infarct volume (FIV) measured on follow-up MRI. The ischemic core was defined as follows: A) cerebral blood flow (CBF) < 30 % compared with the contralateral hemisphere; B) CBF < 20 %; C) cerebral blood volume < 1,2 ml/100 ml. We studied 47 patients. The absolute agreement between ischemic core volume and FIV was poor (ICC 0.64–0.69, RMSE 58.9–66.0). Setting A and C overestimated FIV in 53%, setting B in 26% patients. According to our results, none of the settings was optimal, but we consider setting B the best because of the lowest overestimation rate.

In the second part, we dealt with predictors of clinical outcome according to the infarct growth rate in the early phase – early infarct growth rate (EIGR) from the stroke onset to CTP; and in the late phase between CTP and follow-up – late infarct growth rate (LIGR). We studied 71 patients, with 31% of candidates having a poor outcome (mRS 3–6), and performed intergroup data assessment. Patients with a poor outcome were older (median 78 vs. 68 years; 95% CI 6 to 16; $p < 0.001$), had a larger ischemic core volume (52,5 vs. 10; 95% CI 11 to 81; $p < 0.001$) and FIV (186,5 vs. 18,5 ml; 95% CI 55,3 to 214; $p < 0.001$). Infarct growth rate was faster in the early and late phases, EIGR (23,9 vs. 6,7 ml/hour; 95% CI 3,26 to 53,68, $p = 0,002$), LIGR (2 vs. 0,3 ml/hour; 95% CI 1,1 to 6,1; $p < 0.001$). LIGR and FIV were the strongest predictors.