

Abstract

Prognostic significance of perfusion CT of the brain before interventional treatment of ischemic stroke

Introduction: Perfusion CT of the brain is currently the optimal modality for detecting and determining the extent of ischemic cerebrovascular stroke (AIS). Despite its relatively long availability and proven benefits, it is not yet a standard part of the diagnostic algorithm in most of specialized centers in Czech Republic or abroad. However, the current development of recommendations by professional societies (guidelines) clearly points towards a recommendation for using this method in deciding on the therapy approach for patients with AIS, especially within an extended therapeutic window.

Objective: To demonstrate the potential predictive value of the outcome of neurointerventional procedures in patients with ischemic cerebrovascular stroke who were initially assessed using perfusion CT of the brain.

Methodology: The data were obtained retrospectively, partially from the clinical information system of the University Hospital in Plzen and analyzed using diagnostic software provided by Siemens (Erlangen, Germany). Another part of the data came from the operational log of the Interventional Radiology Department of the Imaging Methods Clinic in Plzen, and the final part from the records of the specialized vascular ambulance of the Neurology Clinic in Plzen. Subsequently, all data underwent standard descriptive analysis and were compared with independent variables.

Results: Perfusion parameters showed statistical significance in predicting a good functional outcome after an ischemic insult, especially in univariate analysis (p 0.0005-0.001). However, in multivariate analysis and against known independent predictors of clinical outcome, their statistical significance decreases (p 0.006-0.033) and is substantially lower compared to these independent predictors, usually by two grades of magnitude (independent predictors $p < 0.0001$). Statistical significance was also demonstrated in a subanalysis of the site of occlusion, where the sparing of certain brain regions according to the visual CBV-ASPECTS score was associated with a better clinical outcome (M3, M5, and M6, primary motor cortex and perisylvian fissure region).

Conclusion: Perfusion imaging of the brain may be beneficial, especially in refining the predictive model after brain ischemia, but the measured data stand alone do not have a strong predictive value. Similar thoughts on brain perfusion imaging have been seen in recent large analyses and meta-analyses, where perfusion parameters were incorporated into recommendations for endovascular treatment in the 2019 ESO-ESMINT Guidelines. Practice has shown that perfusion imaging cannot be relied upon absolutely in terms of indication or contraindication of endovascular treatment, but it can help to refine the prediction of the final state - although this refinement does not affect patient treatment.