Does Preinterventional Flat-Panel Computer Tomography Pooled Blood Volume Mapping Predict Final Infarct Volume After Mechanical Thrombectomy in Acute Cerebral Artery Occlusion?

(Cardiovasc Intervent Radiol. 2013 Aug;36(4):1132-8)

Purpose

Decreased cerebral blood volume is known to be a predictor for final infarct volume in acute cerebral artery occlusion. To evaluate the predictability of final infarct volume in patients with acute occlusion of the middle cerebral artery (MCA) or the distal internal carotid artery (ICA) and successful endovascular recanalization, pooled blood volume (PBV) was measured using flat-panel detector computed tomography (FPD CT).

Materials and Methods

Twenty patients with acute unilateral occlusion of the MCA or distal ACI without demarcated infarction, as proven by CT at admission, and successful endovascular thrombectomy (TICI 2b or 3) were included. Cerebral PBV maps were acquired from each patient immediately before endovascular thrombectomy. Twentyfour hours after recanalization, each patient underwent multislice CT to visualize final infarct volume. Extent of the areas of decreased PBV was compared with the final infarct volume proven by follow-up CT the next day.

Results

In 15 of 20 patients, areas of distinct PBV decrease corresponded to final infarct volume (Fig. 1). In 5 patients, areas of decreased PBV overestimated final extension of ischemia probably due to inappropriate timing of data acquisition and misery perfusion (Fig. 2).

Conclusion

PBV mapping using FPD CT is a promising tool to predict areas of irrecoverable brain parenchyma in acute thromboembolic stroke. Further validation is necessary before routine use for decision making for interventional thrombectomy.

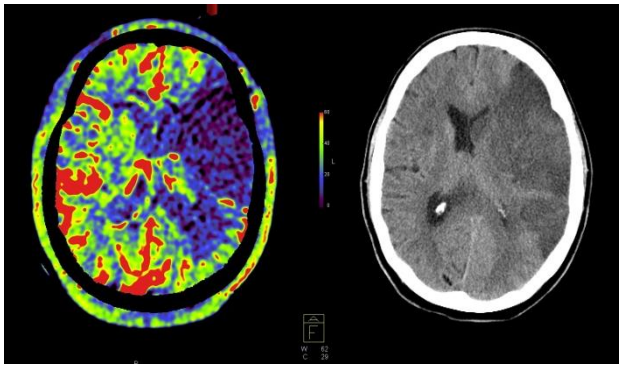

Fig. 1. Preinterventional PBV map (left) predicts final infarct volume in the territory of the left middle cerebral artery as demonstrated on follow-up CT (right).

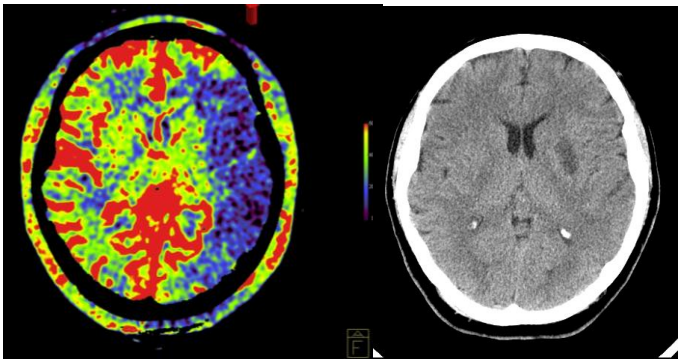

Fig. 2. Preinterventional PBV map (left) overestimates final infarct volume in the territory of the left middle cerebral artery (follow up CT right).