Evaluation of critically perfused area in acute ischemic stroke
for therapeutic reperfusion: A clinical PET study

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To evaluate critically perfused areas in the acute ischemic brain, 9 patients were studied by
positron emission tomography (PET) within 7–32 hours after the onset. The cerebral blood
flow (CBF) and oxygen metabolic rate (CMRO₂) were evaluated and compared with sequen-tial change in CT findings. In all the regions developing subsequent necrosis on CT, CBF dropped below 17 ml/100 g/min. But in some of these lesions, CMRO₂ remained above
the minimum value for regions in which infarction did not develop, and the tissue density on
CT obviously remained normal for several hours after PET scan. The mean CBF in these
lesions (14.0 ml/100 g/min, range: 9.9–17.3 ml/100 g/min) was significantly higher than that in
ischemic areas with low density on CT before or just after PET study (~10 ml/100 g/min, range: 7.7–14.1 ml/100 g/min). These findings suggest that a part of the tissue with CBF
between 10–17 ml/100 g/min is still viable at least 7 hours after the onset of ischemia, but
becomes non-viable in a longer period of ischemia. These lesions should respond to effective
treatment, including therapeutic reperfusion.

Key words: cerebral blood flow, ischemic threshold, cerebral infarction, positron emission
tomography