

# 学位論文の要旨

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学位論文名 Hyperacute Stroke Patients and Catheter Thrombolysis Therapy:  
Correlation Between Computed Tomography Perfusion Maps and  
Final Infarction

発表雑誌名 Radiation Medicine  
(巻, 初頁~終頁, 年) 26, 227-236, 2008

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## 論文内容の要旨

### INTRODUCTION

CT-perfusion (CTP) study imaging, which shows cerebral blood flow (CBF), cerebral blood volume (CBV), and mean transit time (MTT) at once, has been known to be useful for the detection of abnormal cerebral blood perfusion in hyper-acute stroke patients. There have been no papers in Japan that studied outcome of catheter thrombolysis therapy after CTP diagnosis of hyper-acute stroke. Using CTP imaging to assess hyperacute stroke patients, we investigated relationships between the location and the size of the prolonged MTT areas and final infarction areas after intra-arterial catheter thrombolysis therapy until 2005. With some discussion, we also included evaluations of CBF and CBV, outcome of thrombolysis therapy, presence of hemorrhage as a complication after therapy, and patient's outcome as modified Rankin Scale score (mRS).

### MATERIALS AND METHODS

CTP study using the box-modulation transfer function (box-MTF) soft ware based on the deconvolution analysis method was performed in 22 hyper-acute stroke patients. All patients also underwent CT angiography (CTA) to be assessed collateral vessels following after CTP study. Ischemic lesions were immediately treated as far as possible with catheter thrombolysis after CTP and CTA study. Among them, 9 patients with middle cerebral artery (MCA) occlusion within

6 hours of onset were investigated regarding correlations of the location and the size of the prolonged MTT area and the final infarction area. Patients were 5 males and 4 females, with ages ranging 38 to 82 years old (average: 63.5 years).

## RESULTS AND DISCUSSION

Catheter thrombolysis therapy was successful in 7 of 9 patients. However, partial hemorrhage occurred in 4 of these 7 patients after thrombolysis. Regarding the location of the lesions on the Albert Stroke Program Early CT Score (ASPECTS) maps, the decreased CBF areas showed nearly equal or larger patterns than the prolonged MTT areas in 9 patients. Using the box-MTF method, the prolonged MTT area was almost identical to the final infarction area in the case of catheter thrombolysis failure. The decreased CBV areas resulted in infarction or hemorrhage, irrespective of the outcome of recanalization after catheter thrombolysis. But regarding the comprehensive outcome of these patients with recanalization of MCA occlusion, activities of daily living (ADL) at the time of discharge from hospital was favorable, showing mRS of 0 to II, except for one case.

Recently, CTP can be performed soon after plain CT for emergent cases, which can show abnormal brain perfusion sites in a short time. There have been several papers, which reported that prolonged MTT areas in perfusion studies on acute stroke patients were larger in size than the final infarct areas, including MR perfusion studies.

Although we did not investigate large number of patients, the infarct was found in the corresponding site of prolonged MTT areas when recanalization was failed. Otherwise, in our box-MTF method, MTT is considered to include the tracer delay, and to overestimates true prolonged MTT areas. Tracer delay areas might be involved in the abnormal perfusion areas and will be supplied blood flow by the collateral vessels and, sometimes will escape the infarction in time. Differentiation between the tracer delay areas and true prolonged MTT areas is not possible in the Box-MTF method. It is considered necessary to further investigate the possibility that an entire tracer delay area of MTT with MCA occlusion may result in final infarction when recanalization is not achieved.

As we noted in our MCA occlusion cases, the prognosis of patients with MCA occlusion should be favorable if catheter thrombolysis therapy is successful. There have been no reports regarding the evaluation of the size of prolonged MTT areas and collateral vessels on CTA, as a selection category for catheter thrombolysis therapy. In cases where prolonged MTT areas are large in size on CTP study, and with small decreased CBV area, regarding collateral vessel development on CTA study, intra-arterial catheter thrombolysis therapy may be suggested as an optimum or a better choice for local thrombolysis with careful consideration.

## CONCLUSION

The present CTP study with the box-MTF method for hyper-acute stroke patients with MCA occlusion suggested that when recanalization of CBV reduction areas in the prolonged MTT areas was achieved by catheter thrombolysis therapy, hemorrhage or infarct could occur, and even when hemorrhage occurs, the range is limited to a localized CBV reduction area in size. In our cases of unsuccessful thrombolysis therapy with MCA occlusion, final infarctions were identical to the prolonged MTT area.