Evidence-based preventive surgery for cerebrovascular diseases and reduction of treatment risk

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I have clarified the pathogenesis of cerebrovascular disease including cerebral infarction, moyamoya disease and subarachnoid hemorrhage based on the investigation of cerebral blood flow and metabolism and have developed optimal surgery for cerebrovascular disease. In particular, on the revascularization for the vertebrobasilar system, I have established "transposition of vertebral artery to subclavian artery" for stenosis at the origin of the vertebral artery and "superficial temporal artery-superior cerebellar artery anastomosis" for steno-occlusive disease of the basilar artery and have proved the effect of the surgical treatment based on the investigation of cerebral blood flow and metabolism. Recently, according to the above findings, I have developed novel surgical methods with the revascularization technique for arterial dissection in the vertebrobasilar system. In the past, the international multicenter trial had demonstrated that extracranial-intracranial arterial bypass for the occlusive cerebrovascular disease failed to

reduce the risk of ischemic stroke compared with only antiplatelet therapy. However, some investigators suggested the effect of the arterial bypass for a specific subgroup. Thus, I have organized a multicenter randomized controlled trial in Japan (Japanese EC-IC bypass trial: JET) and have proved the effect of extracranial-intracranial arterial bypass for the occlusive cerebrovascular disease by strict study design including measurement of cerebral blood flow. The study is a model of a randomized controlled trial for surgery in Japan. I have also organized another multicenter randomized controlled trial (MCA-Embolism Local Fibrinolytic Intervention Trial: MELT Japan), which determined whether local fibrinolysis with the intravascular procedure was effective for acute embolic occlusion of the middle cerebral artery. The study has demonstrated that local fibrinolysis improves functional outcome. Through these studies, I have recognized the necessity for the standardization of the diagnosis, treatment and evaluation in cerebrovascular disease and have promoted the national standardization. It is pleasure that studies regarding standardization of computed tomography, magnetic resonance imaging and cerebral blood flow measurement are performed by Grants-in-Aid from the ministry of Health, Labor and Welfare of Japan. In the near future, multicenter clinical trials increases the importance more and more, and I will make efforts for the promotion of the trials. In addition, I will establish optimal surgery for cerebrovascular disease based on ,my life work, the investigation of cerebral blood flow and metabolism.