"Contribution to prevention & therapy of Stroke by structuring corporation of Stroke databank and Brain Dock"

Shotai Kobayashi, MD,Ph.D
Professor emeritus/ guest professor of Shimane University
Honorary director of Koundo Kobayashi Hospital

Structuring corporation of Stroke databank

　I have realized again that there is almost no big Japanese clinical data of stroke at the time of 1998 when I became a member of committee of "The second term of National Health Promotion Movement in the twenty first century (Health Japan 21)". In 1999, we started research project to make Japan's first computer-based stroke database that is global standard and it can be used as a database of member's hospital. In 2013, registered case in this stroke databank grew up to 110000 with increase participating hospitals. It is one of the world largest big data. "Stroke databank" series that we published with attending doctors of hospitals is highly evaluated as only one and biggest "Japanese Stroke Data Book". We moved administration office of stroke databank to National Cerebral and Cardiovascular Center Hospital in 2015. We hope more data can be accumulated and can contribute to Japanese medical policy of stroke.

Structuring corporation of Brain Dock (Health check-up of brain)

　Silent brain infarction and micro breed in the postmortem brain of stroke patients were known neuropathologically. However, pre-mortem diagnosis of these silent lesions can be made after MRI development. We started preliminary research of social environmental effect on regional cerebral blood flow (rCBF) and brain function in normal elderly in 1992. The purpose of this study was elucidation of personal difference of brain aging in Shimane prefecture as the most elderly prefecture in Japan. This study revealed social activities gave anti-aging effect to brain function, especially to prefrontal brain function. In 1987, we introduced MRI to our Shimane Institute of Health Science Center (SIHSC) in very early time in

Japan. Silent brain infarction (SBI) was detected in about 30% of these normal elderly people. Surprisingly, these SBI group showed significantly lower rCBF in 5 years before examination comparing no SBI group. Therefore, we thought that SBI should be a reliable marker of high-risk group for stroke. We opened the Japanese first Brain Dock using MRI in SIHSC in 1988. We reported incidence of SBI, risk factors of SBI and relationship of rCBF （Stroke 22:1379,1991）. After that, we confirmed SBI and PVH are significant risk factor for ischemic and hemorrhagic stroke by longitudinal study. It is the first prospective cohort study concerning SBI in the world （Stroke 28:1933,1997）. We also studied very early detection of deteriorating of mental function to prevent vascular dementia. We used higher brain function test battery, event related potential(P3a) (Brain 117:553,1994)、self-rating depression scale (Stroke 23:1716,1992)、apathy scale (Shimane University version) (Stroke 28:2437,1997) from early times. Furthermore, we developed computerized semi-automatic Wisconsin card sorting test (international standard test for pre-frontal function), and used not only in our brain dock but used in more than 800 Japanese institute as a Japan standard. We made effort to improve of diagnostic level of SBI and white matter lesion by adding suitable MRI images, added cognitive function test and carotid echo examination to brain dock as a chief of guideline committee of the Brain Dock. Even now, professor Yamaguchi, my successor of Shimane University continued follow-up study of brain dock, and he reported micro-bleed is significant risk factor for not only hemorrhagic stroke but also ischemic stroke in the first of the world as prospective cohort study. He and Onoda developed new analyzing method of resting functional MRI (rfMRI) and reported brain network function detected by rfMRI is related to cognitive function (J Cogn Neurosci 24:2186,2012). And they also reported differentiation between apathy and depression which thought difficult by functional neuroimaging can be done using rfMRI as the first in the world (Neuropsychologia 77:10,2015). We are now starting study to made big database of rfMRI and easy mental screening test using iPAD (CADi2) in normal and mild demented people using cloud computing

system in "the program of coming true of active life by visualizing brain information and control" in the Impulsing Paradigm Change through disruptive Technologies Program (ImPACT).

It is very important to prolong health life year in rapidly progressing super elderly society, therefore, we want to develop next generation brain dock that can be visualize more detailed brain function.